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"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—SHERMAN.

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THE TERRAIN.*

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THIS subject is one of those that are met at every turn in military writings of all kinds, but are never too old for discussion. For there is danger that the familiarity resulting from such constant acquaintance is only apparent, and tends to make us heedless of how comprehensive is its nature and how deeply it involves all branches of the art of war.

Upon encountering the expression "depends upon the terrain," that occurs so frequently in the works that constitute our means of studying war in time of peace, we are likely to pass it by with a vague idea of taking for granted that it is one circumstance affecting the operations under consideration. But how often does one stop to think in just what way it does affect those operations and to what degree of importance compared to other circumstances?

It is universally admitted that among the many varied factors upon which results depend in warfare, such as numbers,

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training, discipline, supplies, equipment, morale, and weather, the terrain is always a matter of fundamental importance, in every affair from the ground scout hiding behind a stump, to the war ministry of an empire planning the campaigns of an army of millions.

Thus it is at once evident that this subject is one whose importance must be kept constantly in view, and which offers a never failing source of material for study. Military history is simply an account of the manner in which bodies of troops have operated over different kinds of ground, and a description of a campaign or battle is meaningless unless it conveys an idea by maps or description of the nature of that ground.

In all times commanders have felt instinctively the paramount necessity for a knowledge of the topography of the scene of operations. The first thing invariably done by an officer who has been sent to take command of a force already in the field is to make a careful study of the surroundings by maps and reconnaissance. This intuitive feeling that in warfare the terrain forms the essential basis of everything is expressed by the appropriateness of the way in which great generals are so often represented in pictures. A person is impressed with the thought that the map and dividers are his characteristic arms, and not the sword.

The real end of every kind of drill and practice during peace, such as attack formations under normal conditions, is their adaptation to the uncertain and varying conditions of war; and it is a constant aim in practical and theoretical instruction to impress the idea that the terrain is one tangible element that affects everything. This principle is laid down in unmistakable terms in our Drill Regulations by provisions of an axiomatic character, such as the following:

"Make use of all accidents of the surface for cover."

"Care will be taken never to order movements at variance with the accidents of the ground."

Before forming for attack or defense the commander makes the reconnaissance necessary to determine the best disposition to be made."

"The line of defense is in general determined by the configuration of the ground."

"The formation varies in each case to suit the extent and character of the front to be occupied."

"The general will make such changes in the foregoing formations as are rendered necessary by the character of the action and the nature of the ground."

The Regulations for Troops in Campaign scarcely mention the subject; but from the tone such an extract as "The artillery and engineers will be organized in each army according to the nature of the service, and of the theatre of operations," it is manifestly contemplated that every one from the commander down, is to be as familiar with the influence of the terrain as with the drill movements of his own arm of the service.

The murderous fire effects of modern munitions emphasize the importance of this matter. Recent history and developments affirm that success in front attacks is so difficult, and often so absolutely hopeless, as to limit their use to demonstrations, making turning movements the leading feature. Moreover the defense is afforded such powerful means of checking a front attack as to allow it to divert great force to its flanks. Thus the great effect on each side is to manœuvre so as to turn the other's flanks either by detour or by overlapping. And with the continual shift of scene, the contest is likely to become one of using the ground to the best advantage; so that skill and training in that art will be factors of decisive value.

The topography is also the basis upon which a commander tries to form an answer to the question that is constantly presented in all operations, "What is the enemy trying to do?" For out of the cloud of uncertain elements, constituting the fog of war, that conceal the enemy's dispositions and intentions, the terrain stands forth like a landmark. By dictating certain requirements that cannot be disregarded it furnishes a guide for one's thoughts when he comes to imagine himself in his opponent's place, and to ask, "What would I do under like conditions?"

The careful study of this subject is urged by the foregoing considerations on the ground of its indispensable utility in warfare; but in addition peculiar inducements are offered by the facility for the acquirement of such knowledge in time of peace; and by the fact that the definite and practical nature of its in-

fluences removes it out of the darkness of theorizing and speculation more than any other subject in the art of war. A familiarity with these influences is gained by experience in peace manœuvre, and by conclusions drawn from military history; but an unlimited field is offered for extending this knowledge, and becoming prepared to make it practically useful in the test of actual service. The way recommended most highly by authorities is to practice military surveying, which trains the perceptive faculties to notice and appreciate the features of the country. At the same time it develops skill in making maps and in grasping the meaning of those prepared by others, and maps are the essential instruments for achieving the proper use of the ground. One authority says: "A very important habit engendered by military sketching is that of studying the forms of ground and thinking of their effect upon military operations." This suggests the valuable means of practice always offered to military students wherever they may be, of observing the topographical features with a military eye.

Such observation should become a matter of instinct, and something worthy of notice from that point of view can be found in ridges, groves, walls and a hundred other things that are passed unnoticed by an ordinary observer. The familiar country in the immediate vicinity of a man's station naturally forms the most important field for this practice; and the experience gained in military exercises offers a useful and never failing source of knowledge of the capabilities of such features as are found there. This idea is on the same lines as the declarations of a noted geologist that no matter where he might be living, he could always find within a radius of five miles enough things of geological interest to occupy his attention for years.

In actual service the study of the ground is naturally specialized by each observer according to the arm to which he belongs, although a general knowledge is required to enable any one to make reports that will be useful to all. The artillery officer in examining an open tract, notices whether it extends far enough to enable his guns to command it beyond the effective range of small-arms fire. The cavalryman looks for objects that would imperil his troops by furnishing obstacles without

affording shelter. The signal officer seeks commanding sites for stations; and at a river figures whether he can string the wires of his field telegraph line clear across, or must use a cable. The surgeon makes note of sheltered spots where he could establish field hospitals and dressing stations. The engineer considers how he would run the lines of shelter trenches and field works; or what kind of a bridge he could contrive if called upon. The quartermaster is most interested in the character of the roads over which his trains must move; in positions suitable for parking them; and in places offering grassy tracts on which to herd his animals. Officers of the subsistence department consider the capabilities of the country with reference to the supplies that may be drawn therefrom.

It is highly important to become acquainted with the military uses of various kinds of country, and with the geography and topography of different localities. These advantages can be gained while serving at different posts; and it is a universally accepted axiom that every one in the service should use every opportunity to learn the country in which he is stationed, for he is thus acquiring knowledge that may prove invaluable. Moreover, it is evident that the more extensively such practice is carried on, the greater is the chance of finding in any particular command, persons familiar with a certain locality in any part of the country. To further this object, a liberal minded commander encourages and requires those under him to go into the field whenever practicable and learn all they can about the country.

An example of the utility of such knowledge is a service once performed by General Grant with the thoroughness and foresight that characterized everything done by that greatest of soldiers. It was at the time when the troops were being sent to the Rio Grande at the outbreak of the Mexican War. While his regiment was in Louisiana preparing for the long march across the deserts, a guide was engaged who knew every foot of the country. Grant, going beyond anything that could be considered his duty, carefully questioned the guide about the country along the line of march, and preserved the results of his inquiries in the form of rough maps. Some time later the command was deprived of the services of this man (upon whom

they depended to conduct the column) by his death with delirium tremens. And in this emergency the notes prepared by Lieutenant Grant found use that rendered them priceless in value.

A very desirable faculty that can be cultivated only by practical experience is determining by intuition the nature of ground that is not seen from indications presented by the part that is seen. This power is possessed to a remarkable degree by some persons, and its value in warfare is self-evident. An appreciation of it is expressed in an incident that is told of the Duke of Wellington. While out with a party on a fox hunt the scent was lost on the bank of a river. They knew that the fox was not likely to cross in the water, and no bridge was in sight, so that everybody was puzzled, except the Duke. He stated that he knew nothing about the country in that vicinity, but would bet ten to one that a bridge could be found within a distance of one mile. One was found as he had predicted; and when asked for his reason for such assertion, he answered: "I saw three or four cottages clustered together on each bank of the river, and thought that the people living in them would be tempted by their social feelings to contrive a means of visiting each other. A similar inference of mine gained one of my battles."

A practical knowledge of certain laws of geology often forms a scientific basis for forming, without direct observation, conclusions as to the character of natural features of the ground; and these may even be extended to artificial features by the principle that the works of man must always conform to those of nature. A very simple example is the fact that in a country subject to considerable rainfall, such as the vicinity of Fort Sherman, ravines are broad and have gently sloping sides; while we all remember that in the arid valleys of Utah, one must be on the look out for deep, narrow ravines, with vertical sides. Another feature common to all the valleys of Western Utah is the series of benches or terraces formed by littoral action of the ancient Lake Bonneville. Everyone familiar with that country knows that in passing from the base of the foot-hills down into the bottom of the valley, the gentle slopes of the successive benches are separated by steep descents. From a distance the slope may appear continuous, but a knowledge of the configura-

tion to be expected warns one that there are probably stretches of ground entirely sheltered by the crests of terraces. It also appears that in that country the valleys are filled with sediments that were deposited more or less uniformly when rainfall was abundant. But in recent times, erosion is confined almost entirely to streams of water fed by springs and melting snow, and seeking the bottoms of the deepest gaps among the hills, these wear down their beds to great depths, and cut deep channels across the ground in the valleys that were formerly protected from such action by the waters of the lakes. Therefore it is known without a special examination, that from the mouth of every cañon there extends into the valley a gorge that is often of such size as to be of vital importance in any kind of operations.

A rule quite safe to apply in all mountain regions is that the extent of the gulches, or their drainage area, is in a rough way proportional to the amount of water that issues from them, or that leaves indications in the dry runs.

Hence, in traversing an unknown region, one can assume, while allowing for the irregularities that always occur in nature, that those gulches have greater flow head further back in the ridge, and lead to lower passes.

The terrain means literally the ground, but technically it includes all topographical and geographical features, artificial as well as natural, presented in tracts of country of all sizes. Military topography is defined as "the determination and representation of such forms and features of a limited portion of the earth's surface as have special reference to its adaptability for military purposes." The purposes referred to are those involving tactical affairs, and therefore topography concerns most closely those who hold subordinate positions in the service, and whose duties are most practical in their requirements. On the other hand, military geography and strategy, which are correlative in their nature, overlook minor details and involve affairs of great magnitude, to be considered by those highest in authority. Nevertheless, they form a fit subject of study for all in the service, under the principle that those of low rank should have some knowledge of the things dealt with by their superiors, so that the plans and orders of the latter may be better understood and carried out.

Geography, treating of the general features of the terrain, presents less that is available and indefinite than does topography. For example, General Scott in his invasion of Mexico followed exactly the same route from Vera Cruz to the capital as Cortes had used more than three hundred years before. The circumstances attending the two occasions were entirely different, except that the geographical features remained practically the same, and upon these both commanders based the same general plan as to objective, base, and line of operations.

Proper use of the small features of the ground in tactical affairs presents exacting demands for readiness of perception and decision; but operations of great magnitude usually afford a chance for deliberate and definite preparations, and a failure to take advantage of this is inexcusable and is sure to invite disaster. The management of the English military authorities in such matters shows most admirable efficiency. They collect information about a country, and prepare expeditions with as great care and foresight as an enterprising railroad or commercial company. In the movement to Dongola last year they provided large armed and protected steamboats drawing only two feet of water, so as to pass the rapids of the Nile, and built in sections, so that they could be taken apart and carried around the cataracts. Camel corps had been formed for service in the desert; and materials were carried for a field railroad along the line of operations.

Another matter in which strategical movements have the advantage of being controlled by more certain conditions than are operations of less magnitude, is the fact that the ordinary civil maps of a country would probably suffice for use in planning the former. However, those maps are usually on a very small scale, and fail to show many topographical features that have most decisive effects upon the movement and action of troops. Accordingly, those who are on duty at the immediate scene of action must depend upon such rough and hasty sketches as can be prepared. But their main reliance must always be the ability to grasp by a hurried examination the meaning of all features of the terrain, including the most minute. This power is the object sought in studying the influences of this subject, and it would be well to enumerate the features most commonly

met with, and to examine the details that attract one's attention when observing them with a view of their use in military operations.

Communications exercise very strong control over affairs of all kinds, for they are the means whereby troops, material and supplies are moved to the places where the objects of their existence are to be fulfilled. In this rapid-transit age railroads offer such immense facilities that they form the great channels of communication in mobilization and strategy, just as in time of peace they dominate commercial, industrial and social life. A knowledge of any details of their running and construction is of course very valuable, but the thing of most practical importance is to know the points on a line that are most liable to demolition, such as bridges and tunnels, and also to understand the methods of damaging and repairing them. For in war it is a vital consideration for each side to protect the lines of railroad in its possession, and to destroy those of the enemy. Telegraph lines are necessary adjuncts of railways, and when existing elsewhere their location should be carefully noted, as they may be exceedingly useful to the signal corps, and in any case the wires form one of the most valuable materials made use of in field engineering.

Roads are depended upon as routes of communication when railroads are not available, as would always be the case in the presence of the enemy. The effects of the character of a road increase vastly in importance with the length of column that has to use it. Thus anything likely to affect the rate of progress, such as steep grades, rocky places, mires and heavy sand, cause the parts of a column in succession delays that are transmitted to those in rear. Another thing to know is how different soils are affected by rains; the observation of which becomes a matter of habit to persons who are accustomed to riding a bicycle. Some sandy roads are improved by rain; and those composed of sand and gravel, such as form the surface of the valleys in this vicinity, are but slightly affected. These country roads are made simply by the wear of traffic, but under the most adverse conditions of rainfall and frost coming out of the ground are still easily passable. Loam and clay roadbeds are often seriously injured, and alkaline clay, when wet, may

become impassable even for a single man on foot. On account of the necessity that may arise for making repairs, it should be noticed whether there are any suitable materials such as broken stone, gravel, or timber for corduroying. The first thing to know about a particular road is to what place it offers a route. The art of remembering a route traversed and of finding one's way in an unfamiliar locality is recognized as being a prime requisite to military efficiency. A simple trail may possess decisive value, as there are instances where a skillful commander, by using one of the roughest kind, accomplished wonders. There are often difficulties of this kind that must be surmounted and not avoided, as Hannibal said when he had to cross the Alps, "I will find a way or make one."

The points on roads demanding most attention from tactical considerations are defiles. This term includes features varying greatly in nature, such as bridges, causeways, fords, streets of a town, cuts and gulches; but in all cases their value arises from the fact that a small force is given an advantage over a larger one, which is unable to make its strength tell. Their usefulness depends upon whether they are exposed to fire in length, flanks and approaches; are defensible both at entrance and exit; and are liable to be turned.

A navigable river is so great a convenience in strategy and logistics as to afford a most favorable line of operations if other considerations permit such use. But more often a stream influences events through its character as an obstacle. If perpendicular to the front and separating the wings it is a grave detriment; but if on a flank, it forms a most valuable protection. When a parallel to the front, its passage may be exceedingly dangerous, either in advance or in retreat. In all cases, the vital points are the crossings. Permanent bridges are of course to be sought for first, and if these are not available, fords or ferries are next in value. But often arrangements for passing over must be improvised, and then the choice of a point of crossing is a matter of judgment. Technical requirements demand a place where the banks, bottom, depth, width and current are suited to the means at hand; while tactical considerations recommend a point suitable for defense by a bridge-head against its use or injury by the enemy.

The bank having command over the other possesses decisive superiority, because points in rear of its crest are usually afforded shelter from the ground beyond the opposite bank, while that ground is correspondingly exposed. The command is likely to rest with that bank which concaves toward the water, as a result of the manner in which nature causes a stream to form its valley and bed.

The general nature of the country in the theatre of operations greatly influences the way of preparing a force for service. It has been declared that in a heavily wooded country the organization of an army should be modified by using corps small in numbers. If the roads are few and poor, the proportion of artillery may have to be reduced. The extent to which troops can live upon the country affects in a most positive way the questions of supply and of long departure from base. The prevalence of wooded or of open tracts determines whether a greater number of axes or shovels is desirable in the way of equipment.

In localities where the country is either open or broken or wooded for long continuous stretches, there is the usual requirement to make the best possible use of the ground where any affair happens to occur. But ordinarily the topography of a place presents so great a variety of features as to give a chance to exercise judgment in manœuvring so that the scene of combat will assume such position and direction as to give an advantage to those arms of the service in which we excel the enemy; and to the part we are to play as offensive or defensive.

Defensive positions are so highly important that it is in the bearing upon them that nearly all other parts of the terrain are examined. They demand certain well-known conditions that can never be perfectly fulfilled, but must be understood by every one. Any officer down to the commander of a small advance party or patrol may be called upon to examine and report upon the capabilities of some designated position, or be sent to find a position suitable for defense under existing conditions; or have to decide whether or not it is desirable to use extreme measures to hold a particular position until the arrival of a larger force.

Woods act as a screen, interfere with the use of cavalry and artillery, and cause scattering and confusion among infantry, although being most favorable to that arm. These effects de-

pend upon the density and penetrability. In the pine woods of this vicinity, the trees themselves are not close enough together to offer much of an obstruction to movements; but in many places the second growth forms thickets that an individual man cannot penetrate. Scarcely any material for gabions and hurdles could be found, and the trees would be worthless as abattis; but they furnish the very best quality of timber for use in field engineering. Other things to be noted about woods are the roads and paths; the location of the boundaries; and the clearings in the interior.

An open plain is the simplest kind of ground; but is not likely to be selected as the scene of an engagement unless circumstances allow no choice. In such a case ridges and depressions insignificant in size might possess decisive value; for in these days it is considered that the annihilation of an attacking force is the necessary consequence of an advance over open ground unsheltered from the fire of modern small-arms and machine guns. The gently undulating prairie north of the Post is the most favorable kind of a plain for all arms of the service; but the irregularities of the surface are so slight that signal stations on the surrounding heights could observe movements at almost every point.

With regard to the nature of the soil, a simple observation will answer the questions, will heavy sand impede the movements of the cavalry? are these boggy places to interfere with the artillery? is the soil so rocky as to increase or so soft as to diminish the effect of the enemy's projectiles? The influence of the fields depends upon their present condition. Ploughed ground is very difficult for cavalry and infantry in formation, and almost impassable for artillery. Standing crops at the proper stage of growth would attract attention as a source of supplies. Often they serve as a screen, for which purpose corn fields are best suited; and we read of an instance where even straggling potato vines were thus made use of.

Slopes may influence the effects of fire by affecting the danger space and ricochet. With regard to movements of formed troops, the limits and steepness that are feasible, as determined by experience, are given by various authorities. In case of individuals, a man can go anywhere except up the steepest and

smoothest rocks; and a horse is able to go any place a man can, if the man does not hold on with his hands. Any slope less than 3° is considered level; and one over 30° too steep a declivity for military use.

Heights are the features most sought as defensive positions, and the important detail is a military crest that commands the ground in front and shelters that in rear. A slope in front so steep as to leave a dead space affects artillery more than infantry. The heights bordering the valleys in this vicinity offer little advantage as positions, because their slopes are rocky, broken and heavily wooded, and rise into lofty ridges, offering no communications laterally and to the rear. However, some of the minor heights down in the valleys would be very advantageous. In many places they rise in the form of a terrace having a concave face, and a distinct crest that commands the ground for a long distance to the front.

Mountainous regions are very favorable for minor operations, a strong force losing to a great extent the advantage due numbers. Infantry is the predominating arm for service, and a knowledge of the topography is the great deciding element. In all history mountain passes have been key points in both tactical and strategical movements.

Depressions in the nature of railroad cuts and small ravines may serve to shelter the firing line or reserves; or the direction may permit use as a sheltered approach during an attack, especially by a force executing a turning movement. If any are liable to such use by the enemy, an attempt must be made to bring them under an enfilading fire.

In some cases cuts are obstacles of a decisive nature, as when charging cavalry comes upon one unexpectedly.

Valleys are natural guides for the location of roads, railroads, farms and towns. Their extent is the first thing controlling their military use, but the effects of all the varied features presented by their surfaces and surroundings must be considered.

With regard to the enclosures, their extent and the character of the fencing is to be noticed.

Fences act as obstacles without affording shelter, and their important characteristic is how easily they can be torn down. They are slight hindrance to infantry, but a serious obstruction

to cavalry. Hedges, which are practically unknown in this part of the country, are valuable as a screen, while walls are exceedingly useful through the material protection they afford from small-arms fire.

Villages possess great defensive properties if compact, and composed of masonry buildings with walled enclosures, such as are the rule in Europe. There villages have been very often the objects of "fights for localities," that is, for the possession of strong points. They are weak against artillery fire, but are made to serve a useful purpose by first occupying a line outside of the outer line of buildings, and then withdrawing to the inside after the hostile artillery is forced to suspend fire for fear of injuring its own men. Grave disasters have sometimes been caused by the confusion resulting from bodies of troops becoming entangled in the streets of a town. The average American village, with its widely scattered light frame structures, is practically worthless for purposes of defense. However, they would always be useful as sources of supply, and as places to shelter troops in cantonment. Therefore items of statistical information should be carefully collected.

Cities have high strategic value as objectives, by reason of being centres of wealth, resources, commercial lines and government. Their buildings and streets are not likely to involve tactical questions, except in riot duty, and that constitutes a study by itself.

Water for the use of the troops is a thing that is absolutely necessary in all movements. A supply is always found where there are inhabitants, but in remote places it often presents a most grave question. In deserts especially springs and waterholes have such value as to make them the most important features shown on the maps, and in desert warfare they are the great strategic points. They often occur in most unexpected places, so that, unless there is previous information to be relied upon, their location is so uncertain as to make the prospect of a search being rewarded almost a hopeless chance. However, it appears that a kind of instinct for finding sources of supply can be developed by necessity. This can be realized by any one who has sought for water while travelling over barren hills, where the sun makes the rocks too hot to touch; and, while his

lips and throat are blistered from thirst, has scraped out a hole in the mud at the bottom of a shady hollow, and waited for a few drops of water to collect. An acquaintance with the characteristics of a region is necessary to guide a person in such a search. In arid mountains a man knows that streams are likely to dwindle away before reaching the mouth of the gulch, so that he looks for a spring up near the head, and in the side gulches of the slope that drains towards the north. When a choice of sources of water supply is allowed, the best quality may be generally found in springs, streams, lakes, shallow wells, and ponds, in the order given. The most practical rule is that, provided there are no injurious minerals in solution, flowing water is almost certain to be good, even though its course is through marshy ground.

With regard to tactical influence, a body of water is always an obstacle, and permits a clear view over the space it occupies. Therefore, in case marshes or ponds exist in the place where operations are being carried on, the object is to so shape the affair that they prove an embarrassment only to the enemy. Marshy or boggy ground is most effective when it appears firm, but is treacherous to step upon; and this has special weight in the case of cavalry movements. Dense swamps covering extensive areas of country have often afforded the securest kind of a retreat for partisans and bands of Indians.

A lake offers a very strong point upon which to rest the flanks of a line. When thus used, the attack may use it to further his purposes by throwing back a wing or the whole of the defensive force upon the obstacle. In all operations round lakes a decided advantage rests with the side having possession of whatever flotilla there is. A neck of land separating two lakes is an important key point.

In all considerations with regard to the military use of features of the terrain, it must be remembered that in some climates everything is modified during several months of the year by the presence of snow and ice. Rivers and lakes become perfectly passable level surfaces; fields and swamps become alike as to their effects upon movements; routes of communication are changed; heavy drifts may alter the form of minor accidents of the ground; the construction of earthworks is out of the ques-

tion, but in some European armies experiments are made with defensive works built of snow and ice. This transformation caused by winter was often made use of during the colonial wars in this country. War parties could cross the frozen surfaces of lakes, traverse the wilderness on snowshoes, and deliver most telling blows at unexpected points.

Examples from history of the influence of various topographical features might be quoted without limit, but they form a subject as comprehensive as the history of warfare. And such examples are unnecessary, as a consideration of any one of the features commonly encountered calls to mind a campaign or combat where it played a part; and conversely, in reading or thinking of any military operations that have ever been carried on, a person is reminded of those features of the terrain that formed the controlling elements.

SECURITY AND ADVANCE POST SERVICE AS TAUGHT IN RUSSIA.

(From the Russian.)

By Capt. HENRY T. ALLEN, 6th U. S. Cavalry.

ADVANCE post service consisists in securing safety and quiet to the troops, and the following measures are employed to attain this end: 1. The assembling of information concerning the enemy by means of reconnoitring service or of remote mobile security (is imposed chiefly upon cavalry), and of guard service or near immobile security.

If the enemy is at one march's distance (20 versts) the more exclusively are the reconnoitring and security service intrusted to the cavalry; if, however, the enemy is so near that an attack can be at any moment expected, infantry is detached for both forms of service. Between these limits, both kinds of arms take part in the scouting and security service. When troops designated for advance post service are to stubbornly hold a certain point, the artillery may be added.

SECURITY SERVICE.

When the troops are halted near the enemy, *i. e.*, at one march's distance or nearer in a locality on all sides accessible, cavalry is detached for scouting and security service, excepting: 1. When the locality is inconvenient for cavalry operations; 2, when the enemy is so near that our advance posts are in danger of being broken through by his infantry; and 3, during blockades. If security service is intrusted to infantry, cavalry is detached to it for sending out patrols as well as for orderly service in the proportion of one or two sections and a non-commissioned officer per company. The cavalrymen are placed between the guard and the pickets.

CHIEF OF THE ADVANCE POSTS.

A chief of advance posts is detailed for the purpose of maintaining unity of operations of all the troops of the advance posts; he is shown:

1. The length of the front of the advance posts;
2. The disposition of the covered troops;
3. The time required by the troops for preparing for battle;
4. Suppositions concerning further operations of command;
5. Information concerning the enemy;
6. The number and names of the troops detached for advance posts.

THE MAINTENANCE OF SECURITY SERVICE BY A CHAIN OF POSTS.

A company or squadron establishes: posts, pickets and a guard and sends out patrols * or cavalry patrols.

The number of posts established by a company or squadron depends upon (*a*) the effective force of the company; (*b*) the space the company must protect; (*c*) the locality; (*d*) the time of the day; (*e*) the state of the weather and (*f*) the spirit of enterprise of the enemy. On necessary occasions a company may detach from 10 to 15 and a squadron from 8 to 12 posts. The normal force of a post is four men; yet it can be increased to eight men at the principal points of the chain. A post cannot consist of less than three men.

PASSAGE POSTS.

Posts placed on the principal roads going through the chain are called passage posts, while the rest are called simply posts. At the passage posts are questioned all persons approaching the chain, and deserters and parliamentaires are received there. It is the duty of these posts to convoy individuals to the picket, for which purpose they are also made stronger.

Every post detaches a sentinel for immediate observation of the enemy. Local objects allowing a covered approach of the enemy must not be nearer than a reasonably good rifle shot, *i. e.*, from 300 to 400 steps from the sentinel. The remaining men of the post are in rear and covered as well as possible; for infantry, in a covered locality at a distance of 10 to 15 steps and on an open space 50 steps; for cavalry, in a covered locality at a distance of 20 to 30 steps, on an open space at a distance of 150 steps. One of the men of the post is detached by turn as subsentinel and is placed between the sentinel and the other men of the post.

* Patrol=infantry; a cavalry patrol is designated as such.

DISTANCE BETWEEN THE POSTS.

The posts must be disposed so that even individuals trying to pass secretly could not do so unperceived. The average distance between posts for infantry may be from 100 to 300 steps, for cavalry from 300 to 500 steps and in favorable circumstances to about half a verst.* Thus one company may occupy from 1 to 3 versts, while a squadron may occupy as much as 5 versts. In each company and each squadron the posts have a special numbering.

PICKETS.

A company or squadron detaches usually two pickets of 10 to 25 men strong in infantry and from 8 to 12 men in cavalry, conformably to the importance of the section of the chain. The distance between the pickets and the chain of posts is ½ a verst for infantry and 1 verst for cavalry.

The pickets are placed near the principal roads leading towards the enemy and if possible near cross-roads. At least part of the post must be seen from the picket and it is indispensable that those going towards the picket should easily find it. No obstacles rendering support difficult should be found between the posts and the pickets. The locality in the neighborhood of an infantry picket should be convenient for defense and in that of a cavalry picket it should be convenient for attack.

The picket detaches a sentinel from its contingent for the purpose of observing the posts of the chain. The pickets of each company and each squadron have a special numbering.

THE GUARD.

The guard is formed of all the remaining men and presents thus a general reserve of all the pickets and posts detached by the company or squadron; it is placed near the principal road leading through the chain from the protected troops in the direction of the enemy; the best place is the cross-road. If the guard is not placed on the principal road it is obligatory to place a special post on it.

The guard is disposed, for infantry, at a distance of one verst from the protected troops and about half a verst in the rear of

* 1 verst=3500 feet.

the line of pickets; for cavalry, it is placed at a 2 versts' distance from the protected troops, the line of pickets being at one verst's distance in front of it.

In a wooded or very rough locality, as well as when the line of advance posts is too long, *i. e.*, when it is difficult for the guards to support all the posts of the security line, it may be dispensed with by forming pickets of the men not required at the posts; in such a case each half-company occupies half of the section allotted to the company. One of the pickets fulfills the duties of the guard.

If for the posts themselves two complete platoons or more are required, pickets may be dispensed with and all the men remaining from the posts must form the guard.

If several companies are detached for forming the chain of advanced posts, the guards are numbered.

If less than a company or a squadron are detached for advance posts, only posts and pickets are established. If for security service independently of companies and squadrons detached for the chain of advance posts, a special reserve of advance posts is established, the latter marches from the bivouac to the place of the guard and remains there until the establishment of the chain is finished and then returns to its place.

SCOUTING DETACHMENTS AND PATROLS.*

The guard detaches scouting detachments and if there is no cavalry at all, patrols are detached:

1. For the verification of the service at posts and pickets.
2. For the examination of local coverings not occupied by the chain of posts.
3. For the maintenance of communication with the neighboring companies and squadrons.

INTERMEDIARY POSTS.

If the distance between the posts and the pickets, or between the pickets and the guard, is considerably greater than that mentioned above, intermediary posts from 2 to 6 men strong, headed by a non-commissioned officer or lance corporal, are organized for the carrying of reports and instructions. Weak intermediary

* Scouting detachments = cavalry patrol.

posts are also placed in case not a single post of the chain is seen from the pickets.

PAROLE, RECALL AND COUNTERSIGN.

The chief of the command gives every day a special parole, recall and countersign * which is communicated by the chief of the advance posts to the commanders of companies and squadrons designated for security service.

The countersign is communicated to all the men of the company.

The recall is communicated only to the officers and those of the non-commissioned officers who fulfill the duties of an officer.

THE RELIEF OF TROOPS AT THE ADVANCE POSTS.

The troops detached for security service are, if possible, relieved every 24 hours, and never later than 48 hours. The best time for this purpose is before daybreak, as it is then that an attack may mostly be expected.

If the troops remain for more than 24 hours at the advance posts, the posts and pickets are relieved by the guard, which assumes the same duties.

The sentinels of the chain are relieved by men of their own posts by turns, the non-commissioned officers not being subjected to the general turn. This relief takes place not less than in one hour's and not more than in two hours' time, according to order of the chief of the post.

PROTECTION OF SMALL COMMANDS.

Small commands of one company, battalion, or squadron place only posts, at half a verst's distance for infantry and one verst's distance for cavalry; or a picket at the same distance, and the latter in its turn sends out posts at half a verst's distance for infantry and one verst's distance for cavalry.

SEPARATE PICKETS.

If the enemy is at a distance of more than one march from

* For parole, the name of a town is employed; for recall—the name of a saint; for countersign—the name of some object belonging to the military service. All the words must begin with the same letter, for example: Moscow, St. Michel, mooshka (gun sight).

our quarters or bivouac, separate observatory pickets form the basis of the security service. Such pickets are established when the detachment is disposed for rest for a smaller period than 24 hours, when advance posts are established in a locality accessible only in certain places, and for the occupation of less important and more remote points. Separate pickets composed of infantry or cavalry, as dependent upon circumstances, are posted simultaneously with the security chain, for the occupation of points convenient for observing its front and its flanks; these pickets being included in the chain would considerably increase its length. It is more convenient to place the separate flank pickets as far in advance as possible.

Remark.—Concerning the service of separate observatory pickets the same rules are adopted as for the establishing of the posts of the chain of the pickets.

PICKET SERVICE.

The service of the picket consists in placing posts for their own security at a distance of half a verst and from three to four men strong; in sending out guard or reconnoitring detachments for the examination of the whole contiguous region of the locality as well as for the maintenance of communication with the bivouac and neighboring pickets; and in the posting of a sentry at the front. A flying cavalry patrol may be sent out from the picket.

STRENGTH OF THE PICKET.

The strength of the picket is determined by the number of posts established and of the cavalry patrols or detachments sent out simultaneously—the latter being calculated for three reliefs and the length of road of each detachment from four to five versts.

Calculation of men employed for the picket near the village Zgnile Bloto.

(Plan No. 1 of the western frontier region, edition of Kaïgorodov and Prejenzov.)

Cavalry detachment in the direction of the village Ploeydow —3 men (3 reliefs)—9 men.

Cavalry detachment in the direction of the village Stanislavów—4 men (3 reliefs)—12 men.

Cavalry detachment in the direction of the village Sanie—4 men (3 reliefs)—12 men.

For maintenance of communication with the neighboring picket 1 of Kazimierz—2 men (3 reliefs)—6 men.

Flying detachment to the villages Nicolaev and Radogoszoz —6 men.

Sentry at the front of the picket—1 man (3 reliefs)—3 men.

For the security of the picket itself 2 posts of 4 men—8 men.

For the carrying of reports—4 men.

Total 60 men.

Half a squadron is employed in this case.

The strength of an infantry picket depends also upon its remoteness from the troops protected by it; the greater the distance the stronger must be the picket. If the separate picket is composed of infantry a detachment of cavalry must be added to it for carrying reports and for horse patrols.

PICKETS OF DEFENSE.

If a separate picket is charged not only with the observation of the enemy but also with the resistance of an attack, a certain independence is given to the picket and it is called a defensive picket. Such pickets are placed at localities accessible from several directions, for the occupation of the most important points and those nearest to the bivouac.

A defensive picket may consist of infantry and cavalry, with or without artillery; the latter circumstance depends upon the problem given to the picket, whether it has merely to delay the attack of the enemy or whether it is ordered to hold the position while the troops are preparing for battle. Independently of this, cavalry must be detached to the picket for sentry and reconnoitring service.

Remark.—The defensive picket consisting of three kinds of arms may be formed of 2 companies with 2 guns or even of a battalion with 4 guns with a corresponding number of cavalrymen for reconnoitring service. There is reason to establish pickets of such force when the points accessible to the enemy are about 4 to 5 versts and more distant from each other; when

these points are near each other their security may be entrusted to one defensive picket.

PICKET SERVICE.

The defensive picket is protected by its own chain of advance posts and sends out detachments similarly to the observatory picket, the position chosen by it for defense is occupied by the troops on duty, consisting of one-fourth or one-half of the force forming the picket. The remaining men rest in the rear of the position.

When the picket is formed exclusively of cavalry, which will have to fight with the enemy on foot, the part which is designated to dismount is placed in position as the section on duty, while those holding the horses go to the rear of the position behind the resting section (section off duty).

The position designed for the defense must be examined beforehand and if necessary must be fortified, while all the instructions given for its occupation must be timely.

SCOUTS—"SECRET."

Scouts are sometimes sent out in the night in rough localities for the protection of the sentinels of the posts from sudden attacks by individuals and small hostile parties; they are also established in case the hostile advance posts are at a short distance.

A "secret" is a small party of 3 to 5 men or more, disposed secretly at night at a distance of 300 to 400 steps in front of the security chain for the purpose of giving notice of impending danger to the posts and pickets.

RESERVE OF THE ADVANCE POSTS.

Sometimes a reserve of advance posts is detached in addition to all the above mentioned measures when considerable forces are to be protected.

If our advance posts are placed too far in front, *i. e.*, if the advance chain is at distance of more than 2 versts and the cavalry at that of 4, the reserve of the advance posts is composed of cavalry, having at times horse artillery added to it. If the conditions of the locality force the posts to be placed too near to the detachment disposed for rest, the reserve is composed of three

kinds of arms and its force is determined by the time required by the detachment to prepare for battle and by the locality.

The reserve of the advance posts is placed on the main road leading from the enemy, and so that it be convenient to reinforce all the forces of the security service, as well as to keep up a fight with the superior forces of the enemy.

The reserve of the advance posts sends out its duty detachment or detail (= general guard) to the position chosen for defense; this detail consists of one-fourth or one-half of the whole of the troops, the remaining part bivouacs ordinarily in its rear; the artillery places its guns in position where they unlimber; the cavalry draws up behind the infantry. The reserve of the advance posts detaches also a picket and a chain of sentinels in pairs for its own security.

SECURITY IN VIEW OF THE ENEMY.

If the enemy is disposed at a distance of a few versts, the security takes almost a fighting form (before and after battle) —*i. e.*, fighting chains (skirmish lines) are sent out and they are strengthened by strong details.

Remark.—Fighting security may sometimes be considered as follows: as a general guard (section upon duty) the whole fighting contingent, or part of it, occupying the position, leaving in the first case the general reserve and in the second the remaining parts of the detachment at the bivouac. Having disposed the fighting contingent on the large section of the position, it is bivouacked there in reserve order, and patrol chains from the companies, which in case of battle are to do the fighting, are sent out for the occupation of the front of the position. For the observation of the flanks beside the cavalry pickets, infantry pickets are placed at a distance of 1 verst, while "secrets" are placed in advance of the front in advantageous places; a forced patrolling takes place during the whole of the time of rest in front of the position as well as on its flanks.

SECURITY OF QUARTERS.

If the detachment is in quarters the main roads leading to enemy, and especially to cross roads and points convenient for defense, at about one march's distance, are occupied by advance

guards consisting of three kinds of arms. The 1st order train is placed near them as well as the necessary part of the 2d order train.

The advance guards, conformably to circumstances and season, are disposed either in bivouacs, building mud huts during cold and rainy weather or in quarters as compactly as possible, all measures being taken for the most obstinate defense of the chosen position.

In question of security the following measures are taken:

1. If several advance guards are placed at a considerable distance from each other, intermediary pickets of cavalry are placed on intermediary roads.

2. In front of the advance guards, at a half a march or one march distance, separate observatory pickets are placed on the roads leading to the enemy; these pickets send out flying detachments as far as possible and maintain communication between each other by cavalry patrols.

3. For the security of the flanks observatory cavalry pickets are also posted.

4. The troops occupying that part of the rayon which is nearest the enemy are posted more compactly, and

5. The main forces communicate with the advance guards and the latter communicate with each other and the neighboring pickets by means of a flying post (post of about 3 to 6 men placed at a distance of 4 to 5 versts from each other), or by means of some system of telegraph.

The chiefs of pickets are under the order of the chief of the advance guard.

RECONNOITRING SERVICE.

It is indispensable for the successful execution of reconnoitring service:

1. That the reconnoitring should be made continually.

2. That it should be made simultaneously by as great a number as possible of scouts sent as far as possible in various directions.

3. That communication should be kept up uninterruptedly with the enemy when once established.

4. That resource to fight should be had in dire extremity.

5. That the reconnaissance should be made secretly, the traces of one's passage being carefully concealed.

6. That the information sent should be carefully digested, separating the news heard or supposed from what has been seen with one's own eyes, *i. e.*, the reality.

7. That the information obtained should be sent in time and

8. That this information should be sent at the indicated time, although no alteration had occurred since the previous report.

THE COMPOSITION AND FORCE OF THE RECONNAISSANCE.

For reconnoitring service either patrols and cavalry detachments alone are detached, or independent cavalry detachments which send out from themselves posts and horse patrols.

Cavalry patrols are sent out *de préférence* for reconnoitring service. Patrols are detached only in case there be no cavalry at hand and in the immediate neighborhood of the enemy.

These cavalry detachments (scouting parties) are divided into flying detachments, sentry or guard detachments, and detachments for maintenance of communication.

FLYING DETACHMENTS.

To flying detachments belong all troops detached for gathering information necessary to the chief for as full explanation as possible of the situation, by which he is to solve the problem entrusted to him.

One of the following problems may be given to the flying detachments:

1. To gather information concerning the country and the enemy.

2. To prevent the enemy gathering information concerning our troops.

3. To seize hostile scouts.

4. To frighten the advance posts and reconnoitring detachments of the enemy.

FORCE OF THE DETACHMENT.

As flying detachments are sent out at various distances, for a smaller or greater period of time, and for various purposes, their forces vary from one section to two squadrons.

DUTIES OF THE CHIEF SENDING OUT A FLYING DETACHMENT.

The chief sending out a flying detachment is obliged to give definite instructions, consisting of the following, to the chief of the detachment:

1. Information concerning the enemy.
2. The aim and destination of the detachment.
3. Expected information.
4. The general direction to be followed by the detachment or the rayon in which the detachment is to operate.
5. The time allowed for the fulfillment of the problem given.
6. The periods of time in which reports are expected, or the designation of the limits within which reports must be sent.
7. The order of transmission of reports.
8. Suppositions concerning the operations of the detachments from which the flying one has been sent out.
9. Information concerning other troops and flying detachments and the course to be followed in regard to them.
10. What is to be done after the execution of the commission given or upon receiving news that the detachment has begun the engagement.

THE COURSE OF THE DETACHMENTS.

After having marked on the map the course to be followed, *i. e.*, the shortest direction following within the limits (valleys, ravines, skirts of woods) which prevent the movement being perceived, the chief of the detachment must endeavor to traverse the distance to the given point as quickly and secretly as possible; the detachment must follow its course consecutively according to sections in full force or otherwise. Open localities are crossed as quickly as possible.

HALTS FOR REST AND FOR THE NIGHT.

Halts for the night and for rest are made in out-of-the-way places; only in winter and during bad weather is it allowed to stop in separate houses or small villages situated far from the main roads.

The detachment is guarded during the halts by foot sentry posts placed at short distances.

ORDER OF THE MOVEMENT.

On crossing a locality allowing a sudden attack on all sides (hilly and open) the flying detachment must be surrounded by sentry detachments, each of them being at half a verst's distance.

These detachments, according to their relative positions, are called head, rear and flank detachments.

On meeting the enemy before the given aim has been attained, the flying detachment must avoid an encounter, but in case this cannot be done, it must try to take the whole of the hostile detachment, or part, by a sudden attack.

The enemy must be pursued only for the pupose of hiding one's traces.

REMOVING OF TRACES.

The best means of concealing the direction of the movement of the flying detachment is the removing of traces by means of spreading false news, by zigzag marches and by the sending out at times of small detachments in various directions, for the purpose of showing one's self at once in several places.

OPERATIONS OF FLYING DETACHMENTS ON VARIOUS OCCASIONS.

The flying detachment sent out for spying out the enemy, moves in the neighborhood of main roads, observing the latter by special detachments.

The detachment sends out commands of scouts to the village lying near the main road if specially useful results are expected (if there is a post, telegraph or railway station, a police or rural court).

The flying detachment sent out for observation of the already reconnoitred enemy conceals itself, keeping its observing posts in covered places (in the trees, behind hills, and so on); if it is possible to receive detailed information by these means, the detachment endeavors to take, during the night, the hostile post or to catch by ambush the reconnoitring detachment of the enemy.

The flying detachment sent out for ambush for the purpose of taking the hostile scouts, chooses a covered place, if possible a

central one relative to the several directions of the probable movement of the hostile detachments, and organizes ambuscades in places convenient for the purpose.

If the flying detachment is sent out for the purpose of attacking the hostile posts and reconnoitring detachments, its chief, after having designated to his men the place where they are to assemble after the attack, and after having given them the necessary instructions, moves secretly towards the chosen object and then a flying attack must be made, partly in dispersed and partly in closed order; if a secret approach is not possible, recourse must be had to demonstrations.

The chief of the detachment must hold in his hands in closed order at least a small part of the detachment.

If the flying detachment is sent out for the purpose of reconnoitring the locality, or for the observation of the road, it detaches part to places especially convenient for observation, and sends out as well small detachments, which in their turn observe by means of scouts or videttes.

RECONNAISSANCE OF A VILLAGE.

If it be necessary to reconnoitre a small village—the head security detachment passes by the main street, enters the houses and makes inquiries of the inhabitants, while the flank detachments ride on the outskirts.

If the village is large, it is reconnoitred simultaneously by several detachments and a special post is placed at the most important place of the village; two strong flank detachments ride along the outskirts, leaving sentinels at every outlet of the village. Then only do the main forces of the detachment enter the village.

RECONNAISSANCE OF A FOREST.

The interior of a small wood or grove is reconnoitred by the head detachment and its skirts are reconnoitred by flank detachments.

For reconnoitring a large but thin forest the head detachment is strengthened, and forming as it were a line of detachments with the flank ones, crosses the forest at a trot.

If the wood is small but only practicable by roads, the head

detachment passes by the main road, while the flank ones, the number of which is increased, reconnoitre the by-roads.

A large and impracticable forest is reconnoitred by the head detachment on the main road, while the locality at several hundred steps from it is reconnoitred by flank detachments.

RECONNOITRING A DEFILE.

Upon reaching a defile the main forces of the detachment halt without entering the defile, while the head detachment passes through it at a trot and the flank detachments reconnoitre the roads lying nearest to it, and after having sent a report to the main forces of the command concerning the safe crossing of the defile, remain in its front during the whole time the detachment is passing through—which it must do in a trot.

RECONNOITRING A HEIGHT.

The chief detachment, for the reconnoitring of a height, ascends the height while the flank detachments turn it if it be not too large.

RETURN OF THE FLYING DETACHMENT.

The return of the flying detachment is effected in the same manner as its setting out, but in an opposite direction. If a defile occupied by an enemy must be passed on the return, the chief of the detachment looks out for roads to turn it or breaks through the defile during night.

When the detachment is forced to retreat under the pressure of superior forces, the chief of the detachment, if it is not possible to retreat in order, orders his men to disperse in various directions, after having previously indicated the general rallying place.

DUTIES OF THE CHIEF OF DETACHMENT ON HIS RETURN.

Upon having returned to his command the chief of the flying detachment presents immediately an oral report to the chief that sent him, and if ordered, makes also a written one, as follows:

1. In what the given problem consisted.

2. Concerning the way in which the march of the detachment had been organized.

3. The description of the march (its beginning, the course of reconnoitring and most important events).

4. The disposition taken after arrival at the place of destination.

5. The results obtained.

6. The disposition concerning the retreat.

7. The time of return.

8. The losses, distinctions shown.

SECURITY DETACHMENTS AND PATROLS.

The immediate nearest protection is entrusted to sentry detachments and patrols; this protection consists:

1. For the reconnoitring of the sentry line of the advance posts.

2. In the verification of the advance posts.

3. In the observation and reconnoitring in the rayon nearest to the place where the detachment is disposed for rest.

4. In the immediate protection of the command (or flying detachment) during the march, and

5. In the observation of the flank and rear (sometimes also of the front) during the fight.

STRENGTH OF THE DETACHMENT.

Sentry detachments do not consist of more than 2 sections of cavalry, while the patrol consists of one section of infantry.

DUTIES OF THE CHIEF SENDING OUT THE SENTRY DETACHMENT.

The chief sending out the sentry detachment communicates to its chief:

1. Information concerning the enemy.

2. The object of the detachment.

3. The rayon in which the service is to be made or the road it must follow and what point it must reach.

4. Whether it is to wait to be relieved or to return after having solved the given problem.

OPERATIONS OF THE DETACHMENTS AND PATROLS DURING THE MOVEMENT OF TROOPS.

The principal duty of the sentry detachments and patrols

during the movement of the troops, consists in securing them from sudden attacks.

The detachment follows at a distance of 1 to 3 versts and the patrols at that of half a verst from the protected troops, maintaining communication with them and without losing sight of each other.

During the halt of the troops the detachments halt in the same order as they march and continue the protection in places convenient for observation.

OPERATIONS OF THE DETACHMENTS FOR THE PROTECTION OF THE TROOPS DURING THEIR HALT.

During the protection of the command which is disposed for rest, the following can be entrusted to the detachment:

1. The verification of the service of the posts and pickets, and

2. The reconnoitring of local coverings not included in the line of advance posts.

For the solving of the first problem two privates and a non-commissioned officer are detached for the verification of the line, and two privates and an officer for the verification of the line and pickets.

The detachments go along the posts, endeavoring to come upon them unperceived by them, as well as by the enemy.

For the second problem, the sentry detachments or patrols consist of two cavalry sections or one infantry section.

These detachments act conformably to instructions given to flying detachments and are sent out the more often the greater the danger.

SENTRY DETACHMENTS AND PATROLS DURING THE ENGAGEMENT.

For the observation of the flanks of the fighting contingent, in accurately determined places, cavalry detachments after having detached sentry posts for their own security, send out sentry detachments for reconnoitring the locality, the service of the latter being based on the general instructions for sentry detachments (guard cavalry patrols).

DETACHMENTS FOR THE MAINTENANCE OF COMMUNICATION.

Detachments detailed for the maintenance of communication between the various parts of the sentry disposition are of the smallest strength (2 men).

SERVICE OF A HORSE DETACHMENT OUT TO RECONNOITRE AND OBSERVE THE ENEMY.

A cavalry detachment supported by artillery at times can be detailed for two purposes:

1. For reconnaissance and observation in general for a smaller or greater period of time, and

2. For a certain special aim for a determined time (forced reconnaissance).

DUTIES OF A HORSE DETACHMENT SENT OUT FOR A SMALLER OR GREATER PERIOD OF TIME FOR RECONNAISSANCE AND OBSERVATION.

A detachment detailed for reconnaissance and observation in general for a more or less prolonged period of time, must send out a series of flying detachments in the direction of the enemy (about 2 per squadron) and place a line of observing pickets (from 1 to 2 squadrons strong), which in their turn are protected by posts, and which send out sentry detachments.

The sentry detachments must immediately occupy the main roads. The remaining force of the detachment is disposed by echelons in one or two reserve lines and have the following duties:

1. To send out strong flying detachments, directing them mainly to the flanks and rear of the hostile posts;

2. To prevent the enemy from breaking through our disposition.

3. To make forced reconnaissances at times in entire force or with part of it.

NORMAL ORDER.

Squadrons on ordinary occasions do not detach more than two flying detachments each.

A squadron can protect a rayon 5 versts in front and 5 in depth.

A regiment can protect 15 versts front and 10 in depth.

A division (24 squadrons) can protect up to 40 versts front and from 20 to 25 versts in depth.

As the distance to the enemy diminishes, the distances named must also be diminished.

The detachment goes into quarters for rest and bivouacs only in case there are no villages lying on its route.

DUTIES OF A HORSE DETACHMENT SENT OUT FOR A SPECIAL PURPOSE FOR A SPECIFIC TIME.

There may be entrusted to a horse detachment sent out for a special purpose for a specific time:

(*a*) A forced reconnaissance;

(*b*) The taking of this or that point;

(*c*) The destruction of railways, and so on.

It is indispensable for the success of such an enterprise:

1. To choose the object of the attack.

2. To choose the direction in which it must be approached.

3. To entrust to special detachments demonstrative problems for covering the the main forces and for the purpose of diverting attention from them, and

4. To indicate the place of rallying for the detachment after the end of the problem entrusted to it.

REMINISCENCES OF THE SAN JUAN ISLAND IMBROGLIO.

By Col. GRANVILLE O. HALLER, U. S. A. (Retired.)*

INTRODUCTION.

THE Hudson Bay Co. (1859) possessed two trading steamboats, the *Beaver* and the *Otter*, to distribute their merchandise to their several trading posts, etc., from their *entrepôt* at Victoria, B. C. These carried each two cannon for their own protection against Indians. The innocent *Beaver* carried Mr. Dallas on an inspecting tour, and landed him on San Juan Island to inspect the Company's possessions.

Mr. Dallas had just arrived from England to relieve Sir James Douglas, as the Executive Chief Factor of the Hudson Bay Co., and her Majesty's Government had resolved to entrust the office of Governor of her colony, to some officer disconnected with the management of the Hudson Bay Co., and permitted Sir James to dispose of his interest in the company and retain his office of Governor and Vice Admiral in her Majesty's Navy, to enable him to hold Maritime Courts.

Prior to the arrival of the *Beaver* and *Otter*, the Hudson Bay Co. transported freight in sail vessels, and owing to winds favoring them in the channel on the east of the archipelago, known by the Spanish name of *Rosario*, they habitually used it, as the Canal *de Haro* had a great depth of water, too deep for common anchor chains, and its position subjected it to calms in summer (the western winds were cut off by Vancouver Island) and the vessels were at the mercy of the tides. When the Pakenham treaty of June 15, 1846, reached the Hudson Bay Co., the officers very naturally supposed "the Channel" meant the Straits of Rosario, and all the islands in the Haro archipelago were ceded to Great Britain.

* Note.—This paper was written as an explanation of the causes which led up to the "San Juan Imbroglio," as described by Captain Ebstein, 21st Infantry, in "A Chapter of American History," published in the Journal of the Military Service Institution, Vol. XII, No. 52. Colonel Haller has since died.—Editor.

In 1853, Lt. Com'd'r James Alden, U. S. Navy, commanding the U. S. Surveying Steamer *Active*, reported to Professor Bache, Superintendent of the U. S. Coast Survey, at Washington, D. C., the case of one R. W. Cussans, who thinking Lopez Island belonged to the U. S., settled there, and put $1500 worth of improvements on his claim, when he was warned off by the British authorities of Vancouver Island, making him believe that the island belonged to her Majesty.

On the 2d of March, 1853, Congress organized a temporary government for the Territory of Washington, lying between the middle channel of the Columbia River and the 49th parallel N. lat.; and the Legislature in defining boundaries of counties, included the Haro Archipelago. The first assessor of Whatcom County found a fine flock of sheep in care of employés of the Hudson Bay Co. on San Juan Island. The company declined paying the taxes assessed by officials of Whatcom County, who seized and sold some of the band of sheep for taxes claimed. The seizure was represented to Her Majesty's minister at Washington, D. C., and he presented the matter to Governor Wm. L. Marcy, then Secretary of State under President Franklin Pierce. On July 14, 1855, Mr. Marcy wrote Governor I. I. Stevens, executive of the Territory, that the President directed that "the officers of the Territory should abstain from all acts on the disputed grounds which are calculated to provoke any conflicts, so far as it can be done without implying the concession to the authority of Great Britain of an exclusive right over the premises. The title ought to be settled before either party should exclude the other by force, or exercise complete and exclusive sovereign rights within the fairly disputed limits."

It should be remembered that the admission in 1844, by President Tyler, of the Republic of Texas as a State, notwithstanding Congress inserted in the Act the Missouri Compromise line, creating all the territory N. of 36° 30′ free soil, yet the great preponderance of territory south of this line, favored the Southern States, as it was open for slavery if desired by its inhabitants. The indignation of the Northern States was greatly roused by this act, to appease which the Baltimore Convention nominated a candidate pledged to acquire free soil in the Northwest, by claiming all the territory on the Pacific slope up

to the south boundary of Russian possessions, at "54° 40′, or fight."

The election of President James K. Polk, and his declining the overture of Great Britain to establish the 49th parallel as the boundary, stirred up the British spirit as high as that in the United States, and war with Great Britain seemed inevitable. Mexico, encouraged by the prospect of England engaging the United States in war, commenced offensive operations to recover the left bank of the Rio Grande, then held by General Taylor. The crisis had to be met, and President Polk accepted the 49th parallel North to acquire territory South of 36° 30′, to the disgust of the Northern people. The dogmas of Squatter Sovereignty, and Irrepressible Conflict between the free and slave States followed, and, at the period (1859) when General Harney interfered with the well adjusted arrangements of the State Department, and cut short the work of the water boundary commissioners, by "jumping" the British claim through Captain Pickett, the people of the South and their Representatives in Congress, were in the throes of revolution, more certain than were our forefathers when they threw the cargo of tea overboard in Boston Harbor. Indeed, the hope of precipitating a war with Great Britain is the only intelligible explanation of General Harney's quixotic blow at the British lion.

THE WATER BOUNDARY.

Pursuant to arrangements between Great Britain and the United States, President Buchanan appointed Archibald Campbell U. S. Boundary Commissioner. He procured Lieut. John G. Parke, U. S. A., as Astronomer, and Mr. W. J. Warren (brother of the late General Warren, the distinguished corps commander) as Secretary. On her Majesty's part, Capt. —— Prevost, commanding her Majesty's corvette *Satellite*, was appointed Commissioner, assisted by Captain Richards, commanding her Majesty's steamship *Plumper*. All these officers were industriously occupied in their respective duties. Captain Prevost claimed at the outset the middle of the Straits of Rosario; but, his steamer finding a practical passage for the heaviest draft war vessels immediately on the east side of San Juan Island, which channel answered the language of the treaty, be-

ing nearly north and south, connecting the middle of the Gulf of Georgia with the middle of the Fuca Straits, he waived all claim to the islands east of this third or middle channel, leaving San Juan Island only in the controversy.

This was the condition of affairs when the U. S. Navy transferred to the Quartermaster's Department, U. S. Army, the steamship *Massachusetts*, to scour the American waters and drive away all foreign Indians, who were incessantly engaged in rapine and murder, if the current reports were true. The steamer reported for service, when General Harvey, commanding the Department of the Columbia, accompanied by Capt. Alfred Pleasonton, 1st Dragoons, A. A. A. G., and Capt. Rufus Ingalls, Assistant Quartermaster, Chief Quartermaster of the Department, concluded to inspect the military posts on Puget Sound.

After visiting Fort Steilacoom, Lieutenant-Colonel Casey, 9th Infantry, commanding, they embarked on the *Massachusetts* for Fort Townsend, Brevet Major Haller, 4th Infantry, commanding; thence steamed to Sehome, near Fort Bellingham, Captain Pickett, 9th Infantry, commanding, where night overtook the officers. They were entertained at Judge E. C. Fitzhugh's residence, where General Harney remained for the night, the staff stopping with Captain Pickett—all three being classmates at West Point. Next day the party embarked and steamed to Semiahmoo, where General Harney stopped several hours with Mr. Campbell, U. S. Commissioner, while Captains Pleasonton and Ingalls remained in company with Mr. Warren, Secretary. These officers told Mr. Warren that General Harney was going to order Captain Pickett to occupy San Juan Island, and he presumed General Harney's call on Mr. Campbell was to arrange matters. The steamer needed coal, and proceeded to Victoria from Semiahmoo to procure some, where Governor Douglas received General Harney and staff with much cordiality, and entertained the General with a complimentary dinner. Then, according to General Harney's official letter to Governor Douglas, he steamed to San Juan Island, where he learned *ex parte* of the killing of a Hudson Bay company's hog, and determined to transfer Captain Pickett's company to protect the Americans.

On reaching Fort Vancouver, orders were issued directing Captain Pickett to remove his buildings and company to San Juan, and Brevet-Major Haller to abandon Fort Townsend and repair to Fort Steilacoom. In 1859, our Eastern mails arrived via San Francisco, Cal., by steamship. Mr. Campbell's headquarters being at Semiahmoo, was out of the way for mail facilities, and being favored with the use of the lighthouse tender *Shubrick*, it was his custom to come up to Fort Townsend, where quarters were provided for him, and he there awaited the arrival of his mail from the East.

I remember the surprise expressed by Mr. Campbell, the day I received my copy of the orders (requiring Captain Pickett to garrison San Juan, and I to break up the station at Townsend) when I handed it to him to read. He feared very serious consequences, and wrote officially to General Harney on the subject. The orders were promptly obeyed.

On reaching Fort Steilacoom, Major Haller's company was designated to embark on the steamer *Massachusetts* immediately after the monthly inspection (July 31, 1859), to scout the waters of Puget Sound in search of Northern Indians. While sleeping, about midnight of July 30th, Major Haller was hastily aroused and informed that Colonel Casey wished to see him on important business. At Colonel Casey's quarters he found Mr. Campbell, the Boundary Commissioner, who had brought important dispatches from Captain Pickett, by the steamer *Shubrick*. Captain Pickett was seriously menaced on the "jumped" claim, and Mr. Campbell considered him in peril. Moreover, the Northern Indians had committed some murders within sight of Mr. Campbell's quarters at Semiahmoo, and Captain Woodruff's Company (9th Infantry) being in the field escorting and assisting the surveying parties, left none for his protection.

Lieutenant Shaaff, 4th Infantry, and twenty men were immediately detailed as a personal guard for Mr. Campbell, on the boat, and Major Haller's company was directed not to wait for inspection, but proceed at daylight to carry out previous orders and special instructions. The special instructions were verbal, to the effect that the steamer should hasten to San Juan Harbor, and Major Haller was there to communicate with Cap-

tain Pickett, and if the latter needed reinforcements, should land all the troops, and being senior officer, assume command and hasten the *Massachusetts*' return, with information as to the situation of affairs.

Colonel Casey had just seen a short editorial of the New Orleans *Picayune* alluding to the decisive victory of the French over the Austrians, at Solferino, and requested Major Haller to procure him an account of the action, if possible, and send him. Colonel Casey further instructed Major Haller to inform Captain Pickett, that General Harney had not advised him (Casey) of the purport of his (Pickett's) special instructions, and, if he had received any confidential instructions and would impart them to Major Haller, in confidence, for his (Casey's) information and guidance, he would become responsible to him (Pickett) and to General Harney for such disclosure, and should not work to Pickett's prejudice.

The steamer reached San Juan Harbor, late on the 1st August, being a very slow craft. The Britons had a lookout, on a very high hill near the S. E. extremity of the island, which overlooked every approach to their position in the harbor, where H. M. corvette *Tribune* lay at anchor with spring cables. As the *Massachusetts* was entering the passage between San Juan and Lopez Island, the *Tribune*'s drum was heard beating to arms, and on entering the harbor, found her guns run out ready for action.

Captain Pickett immediately dispatched his adjutant, Lieutenant Jas. W. Forsyth, to Major Haller to say he was not well enough to leave camp, but desired an interview before the officers of the British ship might present themselves. Major Haller complied at once with the request, and had a long interview. Captain Pickett regarded the hesitation of the English to land was due more to his weakness in number rather than the principle involved—viz., exclusive occupation; therefore, the offer to land was not accepted, but the constant labor of clearing ground and erecting quarters, with heavy details for guard service, was taxing his command to the utmost, and Lieutenant Shaaff and the twenty men, would be a valuable relief to officers and men; but having to choose between the whole or none, he would not apply for assistance. As to his special instructions from Gen-

eral Harney, he claimed they were comprised in his first order, as follows:

"MILITARY POST, SAN JUAN ISLAND,
"WASHINGTON TERRITORY, July 27, 1859.

"ORDERS.

"No. 1.

"I. In compliance with orders and instructions from general commanding, a military post will be established on this island, on whatever site the commanding officer may select.

"II. All the inhabitants of the island are requested to report at once to the commanding officer in case any incursion of the northern Indians, so that he may take such steps as are necessary to prevent any future occurrence of the same.

"III. This being United States territory, no laws, other than those of the United States, nor courts, except such as are held by virtue of said laws, will be recognized or allowed on this island.

"By order of Captain Pickett.

(Signed) "JAMES W. FORSYTH,
"2d Lt. 9th Inf., Post Adjt."

Captain Pickett further informed Major Haller that next day, at 2 P. M., he expected the captains in her Majesty's Navy would meet him, at his quarters, as they wished to put an equal number of marines on the island, to hold it jointly until the Boundary Commissioners should determine the water boundary, which he should not consent to, but fire on them if they attempted to land. Major Haller reasoned with the captain, called his attention to the instructions of the Secretary of State, W. L. Marcy, who recognized a reasonable doubt as to the channel, of which we now find three, either of which could answer the vague wording in the treaty of 1846, in connecting the Gulf of Georgia with the Straits of Fuca. But President Buchanan had appointed Mr. Campbell to establish with the British Commissioners, the water boundary, which would decide whether San Juan belonged to the United States; that Mr. Campbell was lawfully empowered to decide the question—not General Harney. Captain Pickett decided that the island was U. S. territory, and any foreign armed body attempting to land should be resisted, and he would, if necessary, fire upon them. Again,

Captain Pickett's attention was called to the fact that officers need only obey legal orders, and become personally responsible for carrying out illegal commands; that there could be no objection to the British maintaining their claim by similar occupation, as the United States had. As Haller and Pickett could not agree, Captain Pickett hoped, indeed requested, that this disagreement might not come to the knowledge of the British officers.

About midnight her Majesty's S. S. *Plumper* arrived, dropped anchor and lowered her boats; then armed men descended into the boats, all of which could be made out distinctly, as the *Massachusetts* was close at hand. Major Haller was awakened as the night watch conjectured that the armed men would be carried to the shore, but the boats moved to the *Tribune*, and were freighted with sappers, miners, and marines.

Next morning, Captain Richards, of the *Plumper*, having frequently visited Major Haller at Fort Townsend, called on him on board of the *Massachusetts*. After a pleasant meeting, he expressed a wish to call on Captain Pickett, and asked the major to accompany him and present him, which he did. On leaving Pickett's tent, Captain Richards proposed to take Major Haller to Mr. Griffin's, the Chief Factor's residence, to call on Lieut. Gov. Moody, Royal Engineers, which was agreed to. On the way Major Haller asked the captain if any of their officers had a spare account of the recent battle between the French and Austrians that he could get for Colonel Casey? He could not then recall the name, Solferino. The captain supposed it referred to the battle of Magenta, but when undeceived he said the English mails for some time had failed to connect at the West Indies, when the thought occurred to him that the boundary question might have been adjusted in England, which would explain General Harney's cutting short the negotiations.

After a brief but pleasant interview, Captain Richards informed Governor Moody what he had learned from the major of another French victory. Governor Moody found by his questions that Haller was acquainted with details relating to Magenta, and became satisfied that it was a more recent battle, when there was an ominous pause. Major Haller proposed to Mr. Griffin to take a look at his fine collection of flowers sur-

rounding his house. On his return, the questions asked Major Haller implied what Captain Richards had suspected. Governor Moody wished to know in what manner State Department news was imparted to the army; the organization of regiments, strength of companies, etc. Finding our companies only fifty-two men, when the President could, if any trouble threatened, increase each company to one hundred men, but had not done so, it suggested to the Governor's mind a possibility that the water boundary had been adjusted by the Home Government, rather than risk a great war for a small island.

This occurred in the forenoon, and no doubt had more to do with the hesitation which followed after the meeting in the afternoon between Captain Pickett and H. M.'s Naval Commissioners Hornsby, Prevost and Richards, on August 3, 1859, wherein Captain Pickett refused to "allow any joint occupation until so ordered by my [his] commanding general, and that any attempt to make such occupation as you have proposed before I can communicate with General Harney, will be bringing on a collision which can be avoided by awaiting this issue."

Before the hour of meeting, the *Massachusetts* steamed to Semiahmoo, and landed the personal guard for Mr. Campbell.

USE OF TROOPS IN RIOTS.*

By Captain WM. N. BLOW, 15th U. S. Infantry.

FOR the purposes of this paper mobs may be divided into two classes: Fighting mobs, and threatening mobs. The employment of troops against the former class is relatively simple. It is but a fight at comparatively close quarters along narrow defiles, against an enemy superior in numbers but inferior in arms and organization. It differs little from the street fighting that has characterized every age when cities were carried by storm, and was exampled on a large scale by the Commune after the fall of Paris in 1871. It demands little strategy but requires much physical courage and discipline.

But to handle the threatening mob—the jeering, stone-throwing, property-destroying crowd of men, women and children—to keep it in check without bringing on a general fight, and at the same time to preserve the prestige attaching to regular troops—requires discipline, fortitude, prudence and, above all, moral courage of the highest order. It is to this class that I devote my remarks.

That digressions may be avoided, and the subject simplified, I shall again subdivide it, selecting, from among the various kinds of riots, the commonest—that of railroad strikes—and follow step by step the duties of a commander newly stationed at a post in the vicinity of one of our great railroad centres.

His first care is to learn the city well. He causes military maps to be made of it, dividing it into riot districts and showing all the magazines, gun shops, armories, public buildings, bridges, railroad stations, yards and shops, telegraph and telephone offices (centrals), fire stations, mob centres and other points which it may be necessary to seize and occupy. All the

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officers are required to familiarize themselves with these and the names and locations of the streets, and the general plans and methods of operating the bridges.

The non-commissioned officers learn at their school, streets, stations and more important features of the town.

Carefully prepared plans of campaign are made for each riot district or combination of districts. These are discussed at the lyceums, perfected and filed for future use. A lieutenant is assigned to each district. He is required to visit it frequently, know it practically, and in riots in it is attached to the staff of the commanding officer occupying it.

The troops are drilled in street formations and taught to build barricades.

All men enlisted from the city are transferred to other posts and no new enlistments made from it.

At least two men in each company should understand how to run a locomotive.

In forming plans for campaigns it should be remembered that riots are usually local, and generally occur (I am now speaking of railroad riots) about the railroad yards and shops, around which cluster the cottages, tenements, saloons and dives of the employés. This is the "infected district," and here the mob establishes its rendezvous; plans, organizes and "gins up" for mischief. It is their base and, being the only place where credit can be had for drink, they have but little power or unity if separated from it. By forming a camp at these points the unity of the riot is paralyzed and a large part of it "contained."

Let us assume that a riot breaks out in one or more of these infected districts. For several days the commanding officer has carefully studied the situation through the press and by visits to the infected districts, and his plans are modified to suit the occasion. During this time he is in constant communication with the Department Commander.

The railroad over which the command is to pass to the city has sent a train and two engines with a picked train gang to the post station and a guard is placed over it. Finally the order to move arrives. While the commanding officer is busied with the innumerable telegrams and instructions which come pouring in from department and army headquarters and the

final dispositions and instructions of his command, his second in rank is receiving reports of inspections from captains and superintending the embarkation of the troops. Each man takes on his person 100 rounds of ammunition, a blanket roll and a haversack containing mess kit and three days' cooked rations. Since, during riots his marching is light, he is often separated for days from his supplies and he cannot expect subsistence from the inhabitants, who are invariably either hostile, or they are intimidated by the rioters. In the past much suffering from cold and hunger has been experienced from lack of these precautions. Besides the regular camp equipment the command takes for each organization, 2 crowbars and 2 shovels.

The train is preceded by an engine carrying an officer and ten men to move obstructions and clear the way. The engine pushes before it an empty flat car (which can be seen over) to receive the effects of dynamite and other obstacles on the track. The train proper consists of gondolas which afford a breastwork for the men to fire over, permits an uninterrupted view, and are quickly debarked from. At night all lights except on engine and at rear of train are extinguished. The instructions and orders for the dispositions of the troops are distributed en-route to the city by the adjutant in person. The wording of these orders should be most carefully considered; they should be clear and explicit; the commanding officer assuming full responsibility for offensive operations, opening fire, etc. Nothing is so quickly felt, or is so disastrous in its consequences at all times as moral timidity in a commander, and especially is it pernicious when dealing with riots. Officers and men are not by nature bloodthirsty and only take the lives of citizens through a strong sense of duty, or to protect their own lives, and they have, too, a wholesome dread of civil law. Therefore, if in their instructions they detect timidity or a desire to shift responsibility to subordinates, the subordinates will be likewise vague in their orders, and in turn pass the responsibility on, so that the decision of the gravest questions will pass from the experienced commander to the ignorant recruit; the action of the troops will be indecisive and weak, which the mob quickly detecting, will lose fear and respect for the troops (the main safeguard of order and life) and violence will surely follow. It is

not sufficient for the subordinate commanders to be told to "preserve order and protect property, etc.," or to be "governed by paragraph * * * A. R."; but they must be instructed *how* and *when* to protect it. They must have written orders to fire on the mob under certain circumstances, followed by such authorized latitude as will cover all possible cases, for they know, as well as their superiors, that such vague instructions will afford them no protection before a jury. The weak commander thinks that in giving such orders he avoids the responsibility for unfortunate accidents and errors in judgment, while if all goes well he will reap the reward. But such tucking is not only unworthy of a soldier and debases the mind that entertains it, but unwise from a utilitarian standpoint, since he delegates his judgment and reputation to his inferiors in rank and judgment without escaping accountability for the consequences.

To prove this reprehensible method is practiced I have but to call attention to the fact that in most cases when troops fired on mobs they did so without orders from any one.

On reaching the city the troops debark, each detachment proceeding to its designated post. The artillery is protected by a strong infantry escort and should never be without one, as the capture of a gun by rioters would entail incalculable loss in life, morale, and be an eternal disgrace. Cavalry and artillery should always march from one part of a city to another and *never go by rail.*

The main body proceeds to a central camp, which is established in the infected district (if practicable) where order is to be preserved and the mob contained. It is central in its location regarding the sub-camps and railroad stations and has easy access to them. A guard is at once established around it, guns are placed along the main thoroughfares and sentinels are posted over freight trains loaded with merchandise within the limits of the camp to prevent the soldiers from plundering them —a thing that often happens but is rarely reported. Telegraph and telephone communication is opened with the main lines of the city and all strategic points in the vicinity, above enumerated, and seized and guarded. One-third of the command is held in readiness for immediate service, and at least one company (the next for detail) is kept under arms from 7 A. M., until

the town is quiet at night; as they are constantly going out no company has to wait long under arms. If practicable, guards should be detailed by companies or platoons, so that the others are full for detached service.

Two officers, relieving each other at stated periods, are kept night and day in the telephone and telegraphic tent, to transmit orders, receive reports, etc.; they save the adjutant much labor by filing and codifying unimportant reports, and answering inquiries from detachment commanders and city and railroad officials.

The duties of the adjutant are so multifarious and important during riots as to require particular attention. He often has no office or clerks, hence can keep no regular records, yet every movement, every order and every event must be carefully chronicled. And although he has often to act on his own responsibility and never knows what the most trifling act may bring forth, yet in order that his chief may convert all his mind into judgment he must assume in it the component of memory. To do all this he must keep an accurate diary; know at once where all the constantly shifting detachments are; furnish every detachment chief with orders in writing and preserve a copy of all orders issued, so that when a committee of Congress investigates the riots, as they will surely do if there is a great loss of property or life, he is prepared to protect himself and his commander. He carries a bag (or haversack) with a compartment for all orders and instructions, telegrams, letters received, etc.; in another a carbon pad which records copies of orders issued; and in a third, he keeps his diary and field roster. It is most difficult to keep track of from 40 to 60 detachments at all times of the day and night, and to arrange their details for duty impartially. Inspections of copies of orders or memoranda will not approximate to accomplishing this as I have discovered.

A glance at the roster, Figure 7, will show the location, duty and turn for detail of each organization at any hour, and will be of invaluable assistance in making up the report of operations, and, in case of disaster, in fixing the responsibility for it.

For instance, Figure 1 shows that Companies A and B left for Union Depot at 5 A. M., July 6th, per orders; at 9 P. M.,

FIGURE 7.

Comp'ny	July 6th		July 7th		July 8th		July
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.
"A"	To Union Depot at 5 o'clock Orders No. 1	1st Platoon patrol R'way (left) 9 2d Platoon at Depot	1st Platoon returned at 7 2d Platoon patrol Railway 7.30	1st Platoon at Depot 2d Platoon relieved 1	Returned to Camp 7.30 Telephone	Camp 1	Camp 1
"B"	Same as Co. "A"	At Union Depot	At Union Depot	1st Plat. pat. R'way 1.30 Relieved 8 2d Platoon at Depot	To 21st St. Verbal Order C. O.—9.15	21st Street	21st St.
"C"	In Camp 1st for D. S.	To 51st Street Orders 4 10	At 51st Street	Returned to Camp 4 Order Telegraph	Camp 1	Camp 1	Camp 2
"D"	Camp	1st for D. S. (since 10 P.M.)	1st Platoon to Post Office 10—Orders 1 Returned 9 2d Plat. escort train 8-Ord. 11	1st Platoon in Camp 2d Platoon returned 5	Camp 1	Camp 1	Camp 2
"E"	Camp 1st Platoon on Guard 1	Camp 1st Platoon on Guard 1	Camp 2d Platoon on Guard 2	Camp 2d Platoon on Guard 2	Camp 3	Camp 3	Camp 4

First platoon, Company A, was sent out (by a telephone message) to patrol road; on its return the 2d platoon went out; then 1st platoon of Company B; then 2d platoon of Company B, etc. At 7.30, July 8th, Company A was recalled to camp by telephone. At 9.15 A. M., July 7th, Company B was sent from Union Depot to 21st Street, by verbal orders of commanding

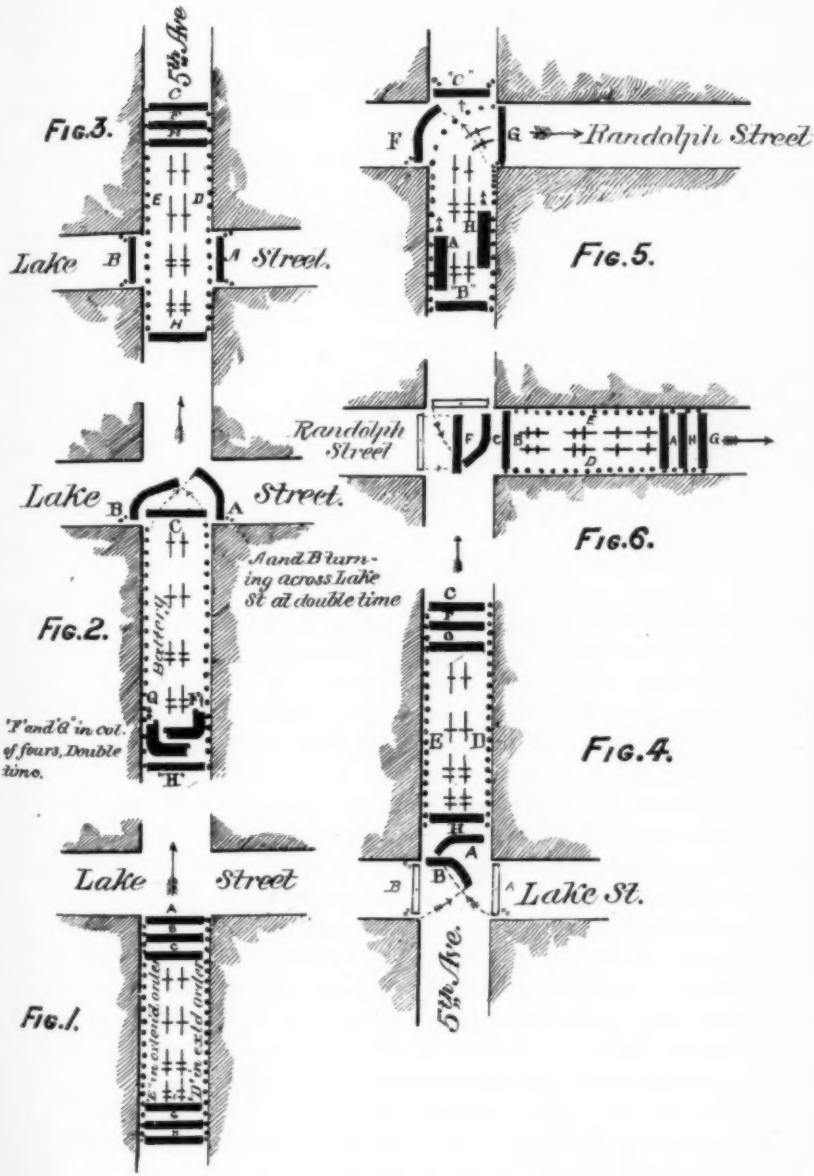


Fig.3.
5th Ave
Lake
Street.
Fig.2.
Lake
Street.
'A' and 'B' turning across Lake St at double time
'F' and 'G' in col. of fours, Double time.
Fig.1.
Lake
Street
Fig.5.
Randolph Street
Fig.6.
Randolph Street
Fig.4.
Lake St.
5th Ave.

officer. Company C was in camp July 6th, and being first for detached service, was under arms until 10 P. M., when it proceeded to 51st Street (per orders No. 4), where it remained until 4 P. M. next day, when it was recalled by telegram; it remained in camp on the 8th and 9th. Company D was in camp on the 6th and became first for detail at 10 P. M. (when Company C took the field); per orders No. 10 its 1st platoon was sent to the post-office, but was recalled at 9 A. M. same day; the 2d platoon was sent out per orders 11 to escort trains; left camp 8 A. M. and returned 5 P. M. The company remained in camp July 8th and 9th. Company E was in camp July 6th, its 1st platoon being on guard; on the 7th the 2d platoon mounted guard; it remained in camp on the 8th and 9th, when the "days in" show 4. In the above, "orders" are often carelessly used instead of "paragraphs."

So much for the history by *companies*. *By days* it is the same. Let us take the afternoon of July 8th; we find A, C, D and E in camp; B at 21st Street; E first for detached service, followed by G, D and A, in the order mentioned.

During strikes some of the larger roads have "riot" or "emergency" offices. These are provided with a force of clerks, telegraph operators, etc., and are under a sort of strike dictator. He is an officer of the road, who has made strikes a special study, and has absolute authority in all matters concerning the existing riots. He has an organized force of armed men at his disposal and an army of detectives and spies among the rioters. These keep him constantly informed regarding the most minute detail of their movements and plans. All roads have some officer whose duties approximate to the above. A lieutenant should be sent to these offices (where he will be welcomed and and all facilities for obtaining information placed at his disposal), whose duty will be to communicate to the commanding officer all that he learns. His uses may be understood from the following, one of many instances which occurred during the riots of 1894: Commanding officer (over phone) to officer in emergency office of ——railroad: "Captain X, at Y Street, wires he is surrounded and threatened by 5000 strikers and wants reinforcements; ascertain the situation." Officer turns to operator who telephones to vicinity of Y Street and in a few minutes re-

plies: "Crowd of a few hundred, looking at company of Regulars, noisy but not dangerous." This is communicated to commanding officer, who wires Captain X: "Hold your position, no reinforcements to spare." Besides the above uses, information is obtained, which, for accuracy and promptness, far excels that which can be gotten in any other way. In large strikes roads sometimes agree on some person (usually an ex-railroad official), who represents them in dealing with rioters, requesting troops, etc. But he is usually a stockholder in some of the roads and his demands and advice regarding use of troops should be received with caution. It is therefore safer to deal directly with the representatives of the various lines who are known to be interested.

Sub-camps are usually established at railroad stations and yards and at public buildings, or where property is to be protected and mobs intimidated. They are in constant telephonic communication with the central camp to which they report, and from which they receive orders. These camps are governed by the general rules enumerated above regarding guards, seizure of points, readiness for action, etc.

Detachments are sent out from all camps when necessary. Outposts, detachments guarding buildings, bridges, etc., in the vicinity of camps are relieved from time to time, depending upon their distance from their camps; food for their entire tour being taken when they are detached. Small detachments should never be made as they only excite the contempt of the rioters, invite trouble, and may bring on a general fight.

When mobs have become sufficiently intimidated and troops can be spared, patrols of not less than a platoon are sent along the threatened portions of roads to keep them clear. The patrol is placed upon a gondola, drawn by an engine on which is a non-commissioned officer and eight men. The engine pushes an empty flat car. The same precautions are observed in escorting trains: Troops are placed on top of freight cars and on the platforms of passenger coaches. Lights are extinguished at night. Patrols move out until the infected district is passed and return on an incoming train.

To move troops through a mob which may begin hostilities at any moment is difficult and dangerous at best. Certain risks

must be taken and no formation is absolutely safe. To scatter the troops or move in loose order (to avoid fire and bombs), is absurd.

The following conditions should be compassed:

1. An advance party, to force back the mob and clear the way.

2. A rear party, to hold it in check.

3. Lateral guards, to prevent its closing in on the flanks of the column at cross streets.

4. Riflemen, to prevent individuals from firing and throwing stones and bombs from windows and house tops.

5. Reserves, to be used at any point when necessary.

The present street column only fulfills the first and second of these requirements, since the columns of fours on the flanks of the moving square are neither a proper formation to resist side pressure of a mob hundreds of feet deep along cross streets, or can the men in such close formation watch or fire upon the opposite windows or house tops.

The following fulfills all five conditions without loss of time or order:

Let us assume that a regiment of infantry with a battery of artillery is moving through an ordinary street, the blocks of which are over 250 feet long, and the mob is threatening and may begin hostilities at any moment, for mere crowds almost any formation will answer.

Companies A, B and C move off in close column, followed by the artillery in double column (closed up as much as possible), while a column of skirmishers from D and E are deployed to the front from their right and left respectively, with from two to four paces distances. When the artillery is in place and marching the remaining companies follow in close column (Figure 1). The column is then about 250 feet deep. On reaching a cross street (Lake) Companies A and B turn at double time to the right and left respectively (Figure 2), force the crowd back and form across Lake Street just beyond its corners, facing outwards. Here they remain until the rear of the column has passed, when they form behind it (Figures 3 and 4), B forming the rear guard. In the meantime Companies F and G have formed column of fours to the front by their right and left flanks

respectively, double timed along the outside of the artillery and formed in close column behind C, thus occupying the positions vacated by C and B (Figures 2 and 3).

The column is then as follows:

Figure 3.—Head: C, F and G, in close column, clearing the way. Flanks: D and E as skirmishers observing windows and house tops on sides of street opposite from them. Rear: H in line—rear guard. Flank guards: A and B in line across Lake Street, holding crowd off the column. Support: F and G.

C and F wheel across the next cross street, leaving G in advance, with H and A in close column behind it, and B is rear guard. In turning a corner, the cross street company, towards which the turn is made, instead of blocking the side street, simply marches across it and blocks the original street (Fifth Avenue) in front of the column. Closing in on rear of column by flank guard companies is similarly executed. And so the artillery is protected, house top assailants are kept out of sight, cross street pressure relieved, the street is cleared and the rear protected. Two companies are always in reserve for use at any point—while the column moves uninterruptedly forward.

If the blocks are longer than 300 feet, or if no artillery be with the command, the advance and rear party move at full distance, instead of in close column, and rear companies close up in line instead of in fours. In narrow streets, or with smaller commands, columns of platoons instead of companies are employed, or the front rank of the advance may wheel to the right and the rear rank to the left in guarding side streets, while men may be further saved by increasing the intervals between skirmishers. Large commands extending over several blocks can protect several crossings by retiring from head to rear of the column in the same way, only companies are relieved at each cross street instead of at the rear of the column. A cavalry column should dismount its skirmishers, horses being led in the square.

Should it be preferred, the two companies designed to hold the side streets can march in column of fours behind the flanks of the advance company, and when side street is crossed wheel outwards and take position as before. But this is open, in part, to the objections of the present street column.

The above formation, somewhat difficult to explain, is very

simple in practice, as I found with the battalion some days since. It required but a few minutes to instruct the non-commissioned officers commanding the companies so that the formation could go forward while the column moved at a quick time, which, by the way, it will never do in a crowded street, as the crowd being entirely swept from the street to the cross streets and not packed back on the sidewalk (as is the usual dangerous custom), the progress of the command will be necessarily slower.

Cavalry is most effective against riots. The fear of being ridden down, and the fact that the horsemen can be seen approaching from the most remote confines of the mob, causes it to give back, when with infantry, (which only the front of the mob can see) the front of the mob is held in position by those behind. The use, too, of the flats of sabres has a most salutary effect upon people, without injuring them. But cavalry cannot be used about railroad yards with advantage on account of the multiplicity of tracks, switches and frogs. They are invaluable flying detachments to disperse mobs and protect property in the vicinity of their camps, which should always contain infantry.

The most perplexing problem in handling a threatening mob, and one for which I have vainly sought a satisfactory solution, is that of keeping it at a safe distance from the troops without unnecessary loss of life. It is a common spectacle to see a company drawn across a street with a mob of many thousand angry strikers, cursing, taunting, threatening and surging within arms' reach of it. Foremost in the crowd are the drunk and the women. So close are they that, by a preconcerted signal, a half dozen rioters could seize and disarm each soldier before a shot could be fired, while supporting troops are prevented from firing for fear of killing their comrades.

A dead line, established in advance of the troops, over which the rioters fear to cross, is of course the solution. But how is it to be enforced? To shoot down the first person who stepped over it is to bring on a street fight by killing a drunken woman who, in her fuddled condition, trusts to her sex for protection, or some person who is pushed over it from behind. To place sentinels along it is to expose them to the fire of the troops. Fire hose answer well, but they are rarely available. The only thing that I can suggest is to arm one man in each company

with a shotgun loaded with small shot (he can also carry buck cartridges for harder work), establish a dead line 30 yards off and pepper every one that crosses, in the legs or body.

If this appears ridiculous to any one I will be obliged to him for a better suggestion.

In conclusion, I wish to add that for want of space I have been constrained to omit several important features, such as clearing districts of mobs and holding them after cleared, dealing with mobs in sections which they have fired and are attempting to burn, supplying troops, camps, etc.

Several of the above measures are suggested from the hundred and odd reports which passed through my office during the riots in Chicago in 1894; and many of them have stood the test of actual trial.

ELECTRIC COMMUNICATION IN THE FIELD.—REMARKS ON EQUIPMENT.

By HOWARD A. GIDDINGS, Late Captain U. S. Volunteer Signal Corps. Acting Chief Signal Officer, 7th Army Corps.

THE demand of the age for instant communication, equally imperative in civil and military life, presented at the outbreak of the war with Spain a serious problem, requiring quick and energetic measures in devising and providing the means by which, throughout the war, the War Department was so effectively kept in constant touch with the American forces, even to the very trenches, within 400 yards of the Spanish lines.

At the outset, it was evident that electric communication would be not only the only satisfactory method, but the only practicable one. The tropical vegetation in the theatre of operations must necessarily greatly restrict the use of visual signals, and it proved in practice to be impossible to make use of visual signals for intercommunication in the army about Santiago, although signal parties were several times distributed, and as often recalled. Except between ships, and between ships and shore, or like use, I do not know of a single message being transmitted by visual signals in Cuba.

For many years attention had been chiefly directed to visual signalling, and the equipment therefor; the principal work in the electrical line being experimental, and no serious attention being given to providing an adequate equipment for extended field service, due, no doubt, to the non-necessity for such an equipment in time of peace, and to the lack of appropriations therefor. The commencement of the war with Spain therefore found us without telegraph trains or electrical equipment, with the exception of some few relics of the Civil War.

Dring the month of July, 1898, the writer, in addition to other duties, was engaged in organizing at Jacksonville, Fla., a telegraph train for use with the 7th Army Corps, which has since been extensively used in and about Jacksonville, Fla., Sa-

vannah, Ga., and Havana Province, Cuba. The wagons had already been contracted for, either by the Signal Office, or by Major George P. Scriven, Signal Corps, the first chief signal officer of the 7th Corps. The wire, lances, instruments, etc., had also been purchased and were constantly arriving, the work in hand being to get the wagons together, from Atlanta, Ga., and New York, devise and have built reels and other interior fittings, place the instruments and wire the wagons, secure the necessary mules, harness, horses, horse equipment, teamsters, etc., preparing the train for the field.

A telegraph train, as developed in the recent war, be it known, is also a telephone train, the greater number of local lines and instruments being telephone, while the more important lines, connecting with the commercial system of the country, were telegraph lines.

Not only were nearly all the interior lines in the great camps providing intercommunication between corps, division and brigade headquarters, hospitals, corrals, depots of supplies, etc., telephone lines, but so were the lines in the field, accompanying the advance under fire, and extending to and along the trenches. The use of the telegraph was more restricted, extending generally only to the connecting of headquarters with the commercial systems. The relative use of telegraph and telephone lines in the war was precisely similar to their use in civil life. The telegraph runs to certain central points in cities and towns, connecting them with the rest of the world, the telephone local lines run everywhere within the cities and towns; so with the army and its camps.

The trains were fully equipped with instruments and wire for building and operating both kinds of lines. As might be expected, the best and most efficient instruments known, were the only ones to work satisfactorily under the trying conditions of field service.

The "Type A" and "Type D" kits of the Signal Corps, for field use, gave endless trouble in the Santiago campaign, and it was only after long distance telephones had been furnished or captured that reliable service was had. The thirty odd telephones of the train I organized were all Bell long distance telephones, remodelled by cutting off the backboard just below

the transmitter, making a very compact instrument, the battery being located in any convenient place.

At the outset it was ordered that the open circuit system of telegraphy should be used on all field lines, and instruments and batteries for this system were furnished. This is believed to have been a dangerous experiment, and one which failed to result in disaster only because these lines were fortunately but little used.

The ablest officers of the service are united in their condemnation of this system, which cannot be used in connection with the commercial system of the country, which requires enough battery at each station to operate the entire line, and which is unfamiliar to the operators and electricians of the United States. It was adopted because it is adapted to use with dry battery, which is non-breakable and very compact, but dry batteries are an uncertain quantity, deteriorate quickly, and are regarded with suspicion by all electricians. Although installed by electrical experts, the system never, in my experience, worked satisfactorily, even on short test lines. Fortunately all the telegraph lines which I constructed connected directly with the Western Union system, battery being furnished by that company, and closed circuit instruments being used.

Following out the open circular system, it was intended that there should be a battery wagon to each station, furnishing an office ready equipped, and battery enough to work the whole line. Battery wagons were issued to me in the proportion of three battery wagons to two wire wagons, and two lance trucks, forming half a train, capable of building twenty-five miles of line. The wagons were excellent, fitted with folding tables for instruments, and very complete. They were drawn by four mules, had a wooden top covered with canvas, curtains, and a step behind. The roofs were white, however, as were those of the wire wagons, and had much better been brown. I was surprised, too, to find that they leaked in the rain, wetting and rusting the instruments. In the battery wagon designed as a central office (with four tables), I had one of the front tables taken out, and a ten-drop switchboard set in its place as a telephone exchange. On the opposite front table was a telegraph instrument so that the operator could from his position reach

either the telephone or telegraph. The switchboard was wired to ten porcelain insulators on the outside of the wagon, and the telegraph instruments and battery were similarly wired to insulators on the outside, so that connections with line wires and ground could be conveniently made.

No ground-bars were furnished, and the sandy soil of the tropics presented a problem in getting a good ground. A common crowbar which I believe had heretofore been used in the limited application of field telegraphy, is a failure in dry sand. Remembering that the British had used in Egypt a hollow perforated iron tube for a ground bar, I found such a bar ready made in the point used in driving wells. These drive-well points are galvanized iron, about three feet long and two inches in diameter. They have a sharp hexagonal head and the shaft is perforated with small holes throughout, having a finely perforated brass sheathing outside and a very fine brass gauze lining inside to keep out grit. A driving cap screws on the end. After causing a short bolt to be screwed in the tube just under the cap, carrying a set screw clamping the wire, these points made perfect ground-bars. Being driven in the earth and filled with water such a bar can hardly fail to make a fine ground in any soil.

The wire wagons were very fine strong spring wagons, covered like the battery wagons, but no interior fittings had been designed for them, and it was found that the space could not be utilized to as good advantage as it might if the dimensions had been slightly different.

No recognized pattern of reel existed. The requirements of the service demanded that the reel should be compact and light, that it should easily and quickly take on or let off a standard coil of wire, and that it could be instantly dismounted and placed in a hand frame. After carefully considering several plans it was decided to remodel a reel then owned by the corps, called the "Hanne Little Giant Reel." This was a skeleton iron reel, like an exaggerated wheel to a chain pump, fitted to a hand frame. By turning the crank backwards, the hubs were spread on the axle and the diameter of the reel decreased to let on or off a coil of wire.

To economize space I caused the axle of the reel to be short-

ened as much as possible and still take on a standard coil, and designed an iron frame for mounting the reel on the left-hand side of the rear end of the wagon. One end of the axle was fitted with a collar, which firmly held it in a bearing attached to the side of the wagon, and the other end rested on an A-shaped frame bolted to the wagon bottom and which carried the friction brake, the whole occupying one-half the width of the wagon.

Just forward of the reel was placed a removable partition to keep the wire, which was piled in coils flat-wise, from sliding back and jamming the brake. The men operating the reel stood on the step behind.

A hand frame, narrowed to fit the remodelled reel, was carried in the wagon for use in running the line in places where the wagon could not go. This reel worked perfectly and in my judgment can hardly be improved upon.

Experience suggests that wire wagons should have tail-boards and curtains, instead of the wooden doors; that the hand reel be made to fold and stow inside, something like a stretcher, and that the dimensions of the wagon body be such as to economically stow the wire in half-mile coils.

One wire wagon was fitted as a "cable wagon" to carry the insulated telephone cable. This wire consisted of a number of fine copper strands with a braided covering. It was about the size of No. 10 iron wire and exceedingly pliable. On this account it was impracticable to remove the coils from the reel after having once broken them, as the wire snarled as easily as string, and required to be very carefully and tightly "laid" on the spool. It was found that [illegible] would carry four miles of this wire, and a number [illegible] cut down as much as possible, and the cable wound on them. One reel was required to each four miles of wire—the wire never being taken off except by unwinding. The Hanne reels did not stow in the wagon as economically as expected, however, and large narrow spools of wood or metal made for the purpose, and with a view of economy in transportation, would be preferable.

The lance trucks were very strong and heavy, weighing three thousand pounds empty. The dimensions were good, but the wagons had two serious faults. The wheel tires were but

two and one-half inches thick and a loaded truck weighing ten thousand pounds cut into the ground badly. I had bad luck with the trucks, one going through a bridge, with its six mules, into a river in Florida, and the other sticking in the mud at a ford, after which I used an army wagon, which was lighter and had broader wheel tires, though less convenient. The tires on a lance truck should be six inches wide, thus greatly lightening the draft of the truck and enabling it to go safely in sand and mud, where with narrow tires it would be stuck. The front wheels of the truck should "cut under." On these trucks they did not, and I remember one instance where the truck could not be turned around on a road one hundred feet wide, and had to be taken a mile to an open field for the purpose of turning it around.

Telegraph trains were, unfortunately, not taken to Cuba and the work in the Santiago campaign was done by hand, under great disadvantages, pack mules being employed to distribute the coils of wire at points along the route. It would seem that for running a line in such a country with its dense vegetation, an effective device would be a reel rigged as a sort of saddle on a mule, extra spools of wire being carried on an accompanying pack mule. Such an apparatus could be easily constructed, and I believe would be very practical.

The war with Spain demonstrated the necessity of an adequate service of electrical communication. To build and operate telegraph and telephone lines, under adverse circumstances in the field, to lay or repair submarine electric cables, and to install and care for electrical instruments connected with the system of fire control, requires expert and professional electricians, linemen and operators.

Electricity is too complex a subject to be easily picked up, and I know of no science in which a smattering of knowledge is of less use than in this. The work cannot be done by amateurs or by ordinary soldiers, however intelligent. The Signal Corps of the army must be reorganized and increased to meet the demands of this service. Its work is to be henceforth the work of the electrical engineer. Visual signals for communication in the field, except in very exceptional cases and in isolated instances, have been relegated to a secondary place, for

henceforth no method of communication will be tolerated but that which brought the trenches before Santiago within twenty minutes of Washington, and which enables constant touch to be maintained with our troops on the opposite side of the globe.

THE ORGANIZATION OF ARMIES.

"A victorious general has committed no fault in the eyes of the public, while he that is defeated always becomes an object of censure, however wise his conduct may have been."—*Voltaire's General History.*

AN able general has always been regarded as the firmest support of his government; for, by his military command, he becomes the true depository of the power of that government and the safest foundation for the hopes of his country to be built upon. The paramount ability of one fitted to be a general consists in his power to properly organize an army and administer the affairs thereof. Organization and administration go hand in hand, and when combined with experience in war, form the grand basis of power in the general's possession. A well-organized and well-trained army may be successful at first with an incapable commander placed over it; but if the war is protracted, bad generalship is certain to bring it to disaster.

We find in the midst of civil life men who are great organizers and administrators, such as have developed our great railroad systems and mercantile establishments; but to take such men and create armies for them to command, would be as absurd as to expect a mob to defeat a trained army equal to its numbers. For the science of war is the most extensive, the most complicated, the most important, and the noblest of all sciences, since it protects the liberty, the religion, the property, the commerce, and the glory of nations. Without a constant study of the science no one is fit to command in battle.

When men who are ignorant of the science of war are placed over those who are to fight battles, a crime is committed before God, not only as to the loss of valuable lives unnecessarily, but

by furnishing the opportunity for disaster, which may bring defeat and eventually cause a nation's downfall.

The American volunteer will go anywhere and attempt anything when commanded by brave and experienced officers, but he soon discovers incompetency—for he is an intelligent and thinking man, and will not fail to air his opinions either through the press or through his political representatives.

Organization is the bringing together of independent parts into a single organic whole, so that they work together with the least possible friction. One of the first results of organization is to obtain the largest measure of force, of strength, of perfection, with the least possible consumption of power.

An army should be so organized in time of peace that, when war is proclaimed, a simple order to assemble will bring all the detached forces together, and work as a whole without friction or rupture. When I was stationed in Arizona, I made application for a new water system for one of the larger posts. Plans for the system, which included the entire machinery for a new double-cylinder pump, were forwarded. The piping was sent from one place, the pump specially manufactured and sent from another, and all the valves and stop-cocks from a third. All the pump machinery was in sections. Not a man who had anything to do with the manufacture came near the post. But the post engineer put the various parts together, attached all the gauges as well as the receiving and distributing pipes, and when all was ready requested me to be present when steam was applied. He turned on the steam in my presence, and the whole system worked to perfection. This was simply an exhibition of the perfection of organization, and there is no reason why an army should not be as well organized.

To sustain a large and complex organization it is absolutely necessary to create a system whereby accountability is clearly and accurately defined. Thus the company commander should be held responsible for the condition of his company, the regimental commander for that of his regiment, the brigade commander for his brigade, etc., even up to the general who commands the army. In order to hold such an organization together, to give it the element of permanency, and to deal intelligently with the varied conditions of its successful existence, it

is necessary that a sufficient number of men of the first order of ability should be selected to secure the highest efficiency and the most perfect condition. This ability is manifest in the knowledge of how to instruct as well as the power to lead.

When, in the year 1776, the American colonies threw off the yoke of Great Britain, and declared themselves free and independent, having no armed force educated in military science, it seemed like flying in the face of Providence to confront, as they did, a nation so powerful as the mother country was at that time. Yet, nothing daunted, they organized a feeble force, threw down the gauntlet of opposition, and dared to meet in open field the educated soldiery of one of the greatest powers on land and "the mistress of the seas." But with the present facilities for rapid transit across the Atlantic, and the improved system of warfare it could not be attempted now without utter defeat.

From a conglomeration of lawyers, farmers, tradesmen, hunters, laborers and clerks, there evolved a United States army which, in 1785, consisted of one regiment of 700 men—eight companies of infantry and two companies of artillery. It might be that some of our political friends would be satisfied to see our army cut down to that number now, as they do not seem to think that we need any more of an army than we had thirty years ago.

It takes something more than a name to make a republic. As a chain is only as strong as its weakest link, so a government is only as strong as the weakest part of its armed force. The history of the world teaches us that all nations eventually have had their fall even as they had their rise. It seems to be a reflex of the law of nature that this should be so. Out in the fathomless abysses of illimitable space worlds are created from nebulous matter, are brought to perfection, then die out and become cold. Fruit goes through the various stages of bud, blossom, immaturity and ripeness, until it decays and falls from the tree. Man himself has not been able to evade the operation of this great law. Death may be postponed, but it comes alas to all. The same, with very few exceptions, has been true of most nations up to the present time. Some have endured for a longer, others for a shorter period. Most of them have at

length disappeared. The laws which govern the growth and decline of nations are no more uncertain than those which shape the evolution of matter or the progress of animal life in the universe. Just as the lifetime of a man is lengthened or shortened in proportion to the respect which he shows for the law of nature, so the lifetime of a nation is lengthened or shortened by the attention it pays to its armed force.

The history of nations has proved that whenever this became neglected the downfall of the neglectful nation soon followed. It is therefore essential that every government should have a standing army in proportion to its contemplated need. Whether great or small, in order to be self-reliant, that army must be well organized and educated in military science, and the education must be progressive, in order to keep up with the progression made in the means by which war is prosecuted. It would be rare folly to take the volunteers of 1861, place in their hands the appliances of 1899, and, without a great deal of instruction, expect them to carry on a war at the present day. Arms, organization, tactics, all have undergone a change in the thirty odd years. To keep an army effective the officers and men must study the developed principles of warfare, as well as exercise themselves in their practical application.

The needs of a country as to its armed force are never known to the people at large until an occasion arises wherein the life of the government is threatened or its national honor is at stake. It is only the officers of the armed forces who, in keeping abreast with the developments in the science of war, know the needs of a country, and commanders of forces should be listened to with regard to the character of organization and number of troops required for the perfection of the organized whole. The Commander-in-chief of the American forces has too many cares of State to become, in his four years term of office, a student of strategy, and no War Minister was ever made that could be taken from civil life and at once understand the details of the entire army, from the recruit to the general—from the squad to the *corps d'armée*.

An army to be efficient, must be officered by a class actuated more by a sense of duty and honor than by financial motives.

The great problem of army organization in the United States

has never been solved. It was as much unsolved when we had a million men under arms during the Civil War as it is to-day, and commanders of its grand bodies never had the rank commensurate with their commands. The American army is the worst organized army on the face of the globe of any nation claiming the position of a third class power, to say nothing of our claims to be a first class-power. There is not even a thorough regimental organization. We stumble along in our happy-go-lucky way, dealing with methods as old as the hills, and when war was precipitated upon us nothing was ready. Witness the formation of brigades and divisions at the commencement of our war with Spain. With the exception of railroad facilities (organized by private individuals) we were no better off than we were at the commencement of the Civil War. When divisions were organized the Adjutant-General did not have a tent, table, desk, or even paper, on which to write an ordinary letter, and up to the time the expedition left for Cuba many of the brigade commanders did not have a tent to occupy for themselves or for an office. The adjutants-general of these brigades and divisions had for a long time to carry their offices in their pockets, and the clerical force was compelled to sit on their thumbs and write on the tops of boxes.

The result of waiting for a declaration of war to organize our army is to cause a lack of efficiency of the Regular forces. Officers are taken therefrom to muster-in and equip volunteers, and many are taken to command the same, and the staff corps are filled with inexperienced men. Thus the Regular regiments are often left to the care of officers who have never even commanded a two-company post; and companies fall into the hands of young officers just appointed from civil life, or to the tender care of graduates who have just doffed the gray. In one Regular regiment that I know, although it had passed through all the battles of the Mexican War as well as those fought by the Army of the Potomac in the Civil War, it was never commanded in battle by an officer of higher rank than a captain.

Any organized army that will admit of officers being taken from staff corps to command the line in time of war, and at all other times occupy bureau positions, is an improperly organized army, and will only produce friction and maladministration. In

the first place the bureaus or staff corps lose the usefulness of those officers in their respective branches, to which they are supposed to have been educated, and the line has no sympathy with them when thrown into command. In the second place, the line has its well-known leaders; their subordinates know those leaders by constant contact with them, and thus have the confidence which leads to success. An army without confidence in its leaders soon becomes an armed mob.

It seems however, that the American army ought to have a corps organization in time of peace, if for no other purpose than to educate a certain number of line officers in the duties of the staff corps, and to have the paraphernalia necessary for the respective brigade, division and corps headquarters when assembled for duty. The reports of boards upon, and personal experience of the writer, during the Spanish war, developed the fact that there was a large degree of helpless ignorance among the junior officers of the staff.

The line force of the Regular army possesses the entire confidence of the American people; but if we judge from the editorials of the press of the country, we are not so certain that some of the staff corps do possess that confidence, and we have seen that decided action was taken by the Senate of the United States when the bill for the reorganization of the army came up for discussion at the last session of Congress.

A thoroughly well-organized army should have its transportation complete, whether it is to be by water, by rail, or by wagon, and each of these three departments should be organized so as to meet the necessities of troops when moving.

The transport service by water at the present time is excellent on those boats which have been fitted up for the purpose; but we have not yet arrived at that point where satisfaction exists as to the railroad service. The troops that have lately been moved from the Department of the East to the Pacific coast, for duty in the Philippine islands, have no cause for complaint in their method of transportation. Each regiment has been furnished with Wagner or Pullman sleeping-car accommodations, with mattresses, etc.; but the journey across the continent is one of six days and nights continuous jog, and the water accommodations for washing and drinking, as well

as closet accommodations, are not sufficient with 33 men to a car.

With the Ninth Infantry the experiment was tried of furnishing hot coffee, made on the train and delivered while the train was in motion at the regular meal hours. A lunch counter was permitted in this car, where men could get ham-sandwiches and a cup of hot coffee, or boiled eggs, buns, milk, apples, etc. This experiment was highly successful, the New York Central Railroad Company furnishing one of their large baggage cars for the purpose, connecting the steam from the engine with the coffee boilers in the lunch car. But this was managed by private parties contracting with the commissary of the train to furnish hot coffee three times per day (one pint per man at each meal) for the amount allowed by the Government as coffee-ration-money—that is each pint of coffee cost just seven cents. And the parties made excellent coffee and pocketed a nice little profit at the end of the journey.

Now it would seem that the Government could own a few cars fitted up especially for this purpose, with the understanding that the railroads should run one of these free with every detachment consisting of at least one hundred men. One end of this car could be arranged for the lunch, coffee and travel rations, and the other fitted up as a wash-room. This would obviate the necessity of stopping along the journey and receiving frequently very poor coffee, as well as give additional comfort to the men for bathing their hands and faces.

X. L. N. C.

FIELD INTRENCHMENTS FOR INFANTRY.

By Captain S. M. FOOTE, 4th U. S. Artillery.

THE part played by field works in the recent war with Spain and in the Filipino struggle have given the subject an interest never before possessed. Instead of being considered purely defensive works they may be used to protect an army on the offensive, enabling it, with the smallest numbers and the least expenditure of nerve force, to extend its lines, protect its flanks and rear and fully prepare, in the very presence of the enemy, for an offensive movement.

Based on my observations in the Santiago campaign and a series of experiments conducted while in command of a battalion of the 3d U. S. V. Engineers under the direction of Col. D. D. Gaillard, commanding the regiment, I venture to submit a few practical notes on the above subject.

The best field intrenchments for securing protection from both infantry and artillery fire is probably the Spanish trench, such as was used in the defenses in front of Santiago. These trenches are simply ditches about two feet wide and four feet nine inches deep, with nearly vertical sides, the dirt thrown out being removed out of view from the front. The advantages of this trench are that troops crouching or sitting in them are absolutely protected from fire of infantry or artillery and present the smallest possible target to enfilade, especially when the trenches are built in short lengths and not on the same line. Second, that the trenches cannot be seen except at very close range, especially when located on high ground.

The disadvantages are the length of time required to remove the dirt and to revet the sides of the trench if the soil will not stand otherwise. Second, the fact that it can be used only at points where no command above the surface is required. Third, the want of room for the passage of officers or men from one point to another in the trenches. This last objection may be overcome, if time permits, by making the trench four feet or more wide and digging the rear half to a depth of about six feet.

The simplest trench that can be dug is the kneeling trench,

Fig. 1 Spanish Trench.

Fig. 2. Improved Spanish Trench.

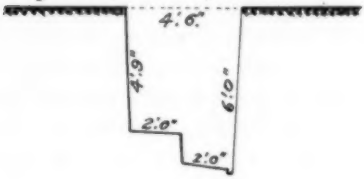


Fig. 3. Lying.

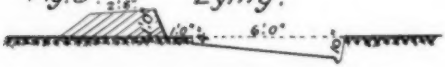


Fig. 4. Kneeling.

Fig 5. 1st Standing.

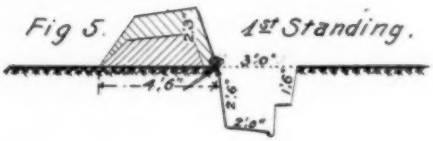
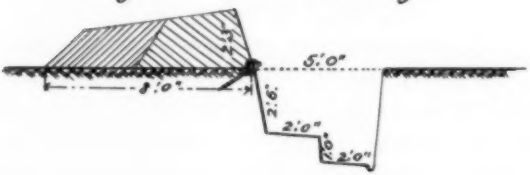


Fig 6. 2d Standing.



about three feet wide, ditch one foot and a half deep and parapet about one foot and a half high. The advantages are that it can be built quickly, and is the one the men dig naturally, each man simply digging a hole in the ground and throwing the earth in front of him. With pick and shovel this trench can be built in ten to fifteen minutes, one man per yard. It offers a smaller target than the lying trench to either enfilade or front fire. The lying trench is about six feet wide, four inches deep at front edge and ten inches in rear, giving a parapet about one foot high.

The advantages of this trench are that it can be dug in from ten to fifteen minutes in almost any kind of soil, and that it offers no material obstruction to the passage of light artillery or cavalry.

The disadvantages are that it offers a large horizontal target to either front or enfilade fire, and that wounds from front fire would probably be "ranging" wounds; in wet weather it is necessary for men occupying the trench to lie in water or mud.

It is a mistake to suppose a kneeling trench is improved or made into a standing trench by digging a little deeper and making the parapet a little higher. That only spoils the trench for kneeling and leaves the crest too low for standing. To convert the kneeling into a standing trench it should be dug down one foot lower and the parapet raised nine inches higher, making the height of the crest four feet nine inches above the bottom of the trench. Instead of digging the whole width of the trench, a width of two feet from the interior slope may be dug, leaving a ledge about a foot wide. This conversion may be made in from twenty to twenty-five minutes.

The advantages of this trench are that it gives the greatest amount of protection for the least amount of work, and that men may sit on the ledge and lean back while resting in the trenches, being protected from front fire and not materially interfering with men standing on guard in the trenches.

The disadvantages are that officers or troops are not protected while passing back and forth unless they move in a crouching position.

To further change the kneeling trench so as to obviate this disadvantage it may be widened about two feet at the top and

the rear half dug down about fifteen inches lower than the front part is already, the earth so taken out being used to thicken the parapet but not to increase its height.

The advantages of this trench are that besides protecting against infantry and shrapnel fired from the front it affords protection and concealment to troops marching back and forth.

In the lying and kneeling trenches a berm of six to eight inches should be left to serve as an arm rest. In the standing trenches, however, the interior slope should be as steep as possible and therefore the berm left should be as narrow as the soil will stand. Revetting material should be used if possible to make the slope nearly vertical. Men are less exposed when standing upright to fire than when leaning forward. Logs, anchored with branches, vines, wire or anything of that sort may be used. If light brush, cane, cornstalks, or anything of that sort is available it may be rapidly made into a continuous hurdle revetment. On stony ground, where wood is not at hand, a few layers of stone may help out. Sod makes a good revetment. Sandbags may be readily carried, form a good revetment, and may be used for raising the parapet and making port holes. Gabions require more time to construct, but make a substantial revetment in any kind of soil.

In all cases the nature of the soil, the materials at hand, and the time available for construction must be taken into consideration, in deciding upon the kind of trench and the revetment to be used.

In laying out trenches there will often be no time available to do more than indicate roughly by sticks or stones the front line of the ditch. If a few moments more can be had, however, the rear line of the trench and the foot of the exterior slope should be indicated and the front line of the ditch accurately marked with cord or by a pick or spade.

The kneeling trench is the one to be ordinarily used, alternating with the lying trench wherever a passage for mounted troops may be required.

There may be cases in which the variations in the ground are such that several or all of the different profiles may be advantageously used in the same general line of intrenchments.

It is well to conceal the intrenchments as much as possible.

It is the fresh earth that shows the most. It should be covered if possible so as to look like the natural earth, or at least take on the general color of the landscape.

If intrenchments are to be thrown out in front of the main line they should be so laid as to be flanked from those in rear in order to prevent the enemy from lying down outside and firing over, if he should capture them.

Drainage must be looked out for, but advantages of location should not be sacrificed to secure easy drainage. Drains leading to the front should be covered or run zig-zag. Drains two feet wide may serve as trenches to fire from.

It is well to look after the thickness of the parapet and see that it is, in every case, not less than two feet and a half thick on the top. Less than this only deceives the men, making them think they are protected when they are not.

In my opinion, infantry soldiers ought not to be required to carry intrenching tools, except in emergencies for a short distance. They should be brought as near as possible to where they are to be used, in wagons or on pack animals.

Reprints and Translations.

THE INTELLIGENCE OF TROPICAL ANTS.

By Dr. EUGENE MURRAY-AARON.

(*From the Scientific American.*)

DURING my first visit to the West Indies in 1880 nothing entomological so impressed me as the superabundance of ant life, both in species and in individuals, and the unrivalled opportunities there afforded for the pursuit of studies into the degrees of intelligence exhibited by these creatures, undoubtedly the highest development of the articulate type. From the first I was impressed, as I had already been by the literature of the subject, with the fact that just as the butterflies of the tropics were more beautiful, just as the beetles were larger and more powerful, just as the odonats were stronger of wing, the stridulating orthoptera more overwhelmingly sonorous, and just as each of the orders appeared to reach the most pronounced type of its kind upon nearing the equator, so the ants of the tropics exhibited to a greater degree than did their northern congeners those wonderful attributes of mind for which they have been famous since the days of Huber.

More or less close study of these creatures in their own homes, some of it in Jamaica and Haiti, of the most painstaking nature, and some further studies made upon ants brought north with me from Haiti, have but confirmed and strengthened my high estimate of their intelligence.

Familiar with the many experiments which the fertile ingenuity of Sir John Lubbock has placed before us, acquainted with the writings of Huber, Ellendorf, Lincecum, Belt, Bates, and our own McCook, I have profited by their labors and suggestions in following many lines of experimentations in somewhat different directions from theirs. It is from notes of very many observations that the following accounts are derived. While the limits of this paper preclude the possibility of any connected attempt to point out the bearing of these testimonies upon the great evolutionary scheme of nature, it may, at least, serve to point out how rich a field awaits the painstaking resident student in the tropics.

Having in mind the experiments of Lubbock, wherein he showed the strong likes and dislikes of many ants for certain colors, and in which he discovered that, in a colony of nearly 2000 ants brought under the influence of four principal colors, 890—or nearly one-half—were found congregated beneath the slip of red glass, 544 under the green, 495 under the yellow, and only five under the violet, I planned a series of experiments on one of the tree inhabiting species common in the lowlands of

Jamaica. This species builds an oblong globular hornet-like nest, about one foot in diameter, sufficiently high in trees or shrubs to be safe from the occasional inundations of the rainy season. Into the side of one of these I carefully cut a round hole about two and one-half inches in diameter, and over this I pasted a piece of thick black cloth. This work was, of course, done at night; he would needs be a hardy or pachydermatous student who would undertake as much by day. The next morning, after carefully and quickly removing the cloth cover, I allowed the sunlight to pour into the nest, to the very evident discomfiture of its inhabitants. Yet much as the interior workers or builders of this species dislike the light, they continued to engage in frantic efforts to bring the building pulp from the inner chambers of their nest in their attempts to patch up the hole. This work they continued, and in far greater numbers when I placed a red screen between them and the light, but their numbers decreased under a green or a pale orange light to about the same as under the pure sunlight; and with a screen of a bluish-purple color I was able to drive every one of them back from the hole into the inner recesses of the nest. It was evident that these were like minded with the species of the genus Lasius experimented upon by Lubbock, and that the colors acted upon them in a graduated series, which exactly corresponds with the order of color influence on a photographic plate.

Several other like experiments resulted in apparent proof that this color sensibility was common to all species of the ant tribe; but when I came to experimentation on their susceptibility to sound waves, my results were widely dissimilar to those obtained by Lubbock.

Sir John reports that, after many experiments, he has failed to find that such sounds as those produced with tuning forks, violins, shouting, whistling, etc., produced even the slightest influence on various species of the genera Lasius and Formica. He also was unable to obtain any evidence, by the use of sensitive flames, the telephone, or the microphone, that his ants emitted sounds inaudible to human ears. One of my first experiments was made with the tree-inhabiting species, already referred to, and consisting simply in whistling and tooting on a crude bamboo fife close to very many of their nests. The results were identical in every case, with one exception; and, as a few blows on that nest resulted in nothing, I came to the conclusion that it had been abandoned. In every case very high or shrill notes brought many of the occupants of the nest to its mouth, not apparently in alarm, rather from curiosity; but deep or bass notes invariably resulted in driving them back. For example, on whistling the first four bars of "Die Wacht am Rhein" in as high a key as possible, I immediately collected a wondering, but apparently appreciative audience of several hundred ants; when, however, I dropped an octave or more and whistled the deeper notes of the refrain, I drove my audience indoors in short order. These results led me to try another experiment, that of first attracting an audience with a bamboo fife and then treating them to a thunderous serenade on

the negro's most beloved musical instrument, the tom-tom. The haste with which they tumbled over each other in the effort to seek security within showed evident fear. Very naturally, this led to yet another experiment. At the beginning of several tropical thunder showers I brought out the members of various colonies of this species, but invariably at the first following thunder-clap the retreat produced by the tom-tom was repeated. Much the same result was produced on several of the earth-inhabiting ants. I have finally arrived at the conclusion that the thunder and the almost equally deafening roar of a tropical downpour are at the bottom of the ants dread of sounds approaching the bass octaves; while curiosity is the basis of their appearance in answer to the higher notes, combined, perhaps, with their acquaintance with the shrill and high notes made by stridulating insects during all periods of calm weather.

The early experiments of Huber, afterward confirmed by Lubbock and others, to the effect that it is the sense of smell which is most acute in ants and whereby they track one another, is well known. Huber, having obliterated the scent along one of their trails by drawing his thumb across it, observed that ants arriving at that point became confused and wandered about aimlessly until discouraged or until the trail on the other side of the obliterated space was run upon by chance. Lubbock's more systematic experiments have proved beyond dispute that ants are guided by odor, and not by sight; that they are confused by losing the scent of their predecessors, and not by missing their footprints or other visible signs. The fondness of ants for an overripe pineapple is one of their prominent characteristics. Taking the juice of a rotting pineapple on a camel's hair brush, I ran it around in varying curves and sweeps on the galvanized roof of a manor-house porch, on which no ants could be seen at the time. That I might be able to identify the track made, I at the same time drew a pencil mark along the middle, but to satisfy myself that it was not the lead pencil mark that any formican pathfinder might follow, I drew frequent offshoots or bypaths with the pencil. An hour or two of tropical sunlight removed all visible signs of the pineapple juice, at least to my eyes, as it did also to my sense of smell. Not so to the ants, which one after the other, I placed at the edge of the roof where the pineapple trail started. Each of these at a rapid gait and with unfailing accuracy followed the track until a piece of pineapple, the well earned prize, was gained at the end. In reaching this prize by a very circuitous route they passed very near it several times but, although its odor must have been perceptible from these points, they invariably kept along the intended highway. In not a single instance was one of the false tracks of the lead pencil followed, nor could I detect the most momentary faltering at any such meeting of two ways. At one place, however, where I later painted a fork in the road, the latest, and, presumably, most odorous path was taken, although it was much the longest way to the goal. When with a sponge dipped in

hot water I washed away about eight or ten inches of the trail and drove the next ant off in an entirely wrong direction, each of its followers took the same wrong track, although the piece of pineapple was near at hand in just the other direction. When, however, I drove another ant directly to the prize from this break in the trail, and, after it had been allowed to partake of the coveted sweets, drove it back over about the same route, there was no hesitancy on the part of any future visitor to follow the path thus marked out. Clearly it was the power of scent, scent at close range, not that at any distance, which resulted in these exhibitions of the pathfinding power.

Four months having been the extent of my residence at any given locality in the tropics, I have not been able to make the extended tests as to the length of memory of ants that have been made by some others. Belt tells us that, while resident in Nicaragua, he was instrumental in driving a colony of leaf-cutting ants from their nest by pouring dilute carbolic acid into it, and they took up their abode in a newly constructed home about two hundred yards away. A year after this he had reason to drive them from this nest, and, greatly to his surprise, they immediately betook themselves to the former domicile, which in the meantime had been utterly deserted, and apparently, unvisited. Karl Vogt, in his "Thierstaaten," narrates the achievement of a colony of Formica fusca which used to go through inhabited streets to a chemist's shop, 600 meters distant, in order to obtain access to a vessel filled with syrup. As this was repeated from year to year, each early summer seeing the long column, broken by the cold of the autumn before, reorganized and active, it is fair to conclude that the ants remembered the existence and whereabouts of this syrup store from year to year.

A colony of Formica omnivora at the Baths of St. Thomas, Ja., divided by me in early July, and widely separated, had part of each new colony taken over to the other on my visit to that place in late October, nearly four months later. Although omnivora is a most savage and warlike little creature, attacking and killing every stranger that ventures within or even to the orifice of its nest, in every case the ants thus brought back were recognized as relatives or former comrades, although individuals of the same species from other nests were instantly set upon and torn asunder. Much more remarkable than this was a case studied and vouched for to me by the Hon. William Bancroft Espeut, by whose recent death her British Majesty's colonial government and the study of tropical botany both lose a valued adherent. Mr. Espeut had his winter home on the north coast of Jamaica and his summer residence high in the Blue Mountains, overlooking the Liganea Plain, back of Kingston; the two were about twenty miles apart by the road. Specimens of the genus Echiton, the foraging or army ants, were taken from the lowland to the mountain residence, and after three years some of them returned to their fellows, were instantly recognized and welcomed home, if antennal caressing and like signs of good fellowship are to be thus inter-

preted. Now there is no species of the Formicidæ that is more savage in its treatment of intruders than are the species of the genus Echiton. However, it is not entirely safe to attribute this power to memory in its exact sense, as is shown by an experiment made by Lubbock. As described in Romanes' "Animal Intelligence," Sir John "separated some ants from a nest while still in the condition of pupæ, and, when they emerged from that state as perfect insects, transferred them back to the nest from which they had been taken as pupæ. Of course in this case the ants in the nest could never have seen those which had been removed, for a larval ant is as unlike the mature insect as a grub is unlike a beetle; neither can it be supposed larva, hatched out away from the nest, should retain when a perfect insect any smell belonging to its parent nest—more especially as it had been hatched out by ants in another nest; nor, lastly, is it reasonable to imagine that the animal, while still a larval grub, can have been taught any gesture signal used as a password by the matured animals. Yet, although all these possible hypotheses seem to be thus fully excluded by the conditions of the experiment, the result showed unequivocally that the ants recognized their transformed larvæ as native-born members of the community." Parallel to this and somewhat supplementary to it is my own experience with individuals of Formica omnivora, and two of its congeners, both as yet unidentified, which I brought away from Haiti on my last visit to that island. Omnivora and one of the other two species were transferred in both the mature and the larval stages, the other only in the pupal stage. Some of the immature forms of all three were intrusted to each of the adult colonies to rear, for, as Romanes observes, "it is to be noted that, although ants will attack strange ants introduced from other nests, they will carefully attend strange larvæ similarly introduced." After all had attained the mature state I thoroughly satisfied myself by repeated and various experiments that each recognized its own blood relationships, while quick to resent the intrusion of any others. The mystification displayed, and the very evident signs of conflicting disposition on the part of the younger adults, who, having been recognized by their older relatives, and having recognized them in turn, saw the young adults of another species, with which they had been reared in perfect harmony, torn limb from limb by these same relatives, formed one of the strangest sights I ever witnessed in the entomological world.

The feeling of fellowship and sympathy varies in intensity very greatly in various species of ants; and not only through the difference in species can we trace this, but even in individuals of the same colony, under entirely like conditions, are very different degrees of sympathy to be observed. Belt tells us that he found the army ant, Echiton humata, always ready to aid a distressed fellow from its own colony. Specimens that he plastered to the ground with clay pellets, the head or only the antennæ being left in sight, were always rescued as soon as the first good Samaritan on the scene could return with suf-

ficient reinforcements. Yet I found that while in some colonies of Echiton this was the almost invariable rule, the adjoining colony, perhaps, would be mostly composed of individuals utterly indifferent to the claims of a fellow in distress. My favorite experiment was to tie an ant near its home, fastening it by some of the finest jeweler's wire to a nail firmly driven into the ground, passing the wire around at the juncture of the thorax and abdomen. Various were the means used to free the prisoners under these circumstances, from the laborious and futile one of digging around the nail to the heroic, but rather drastic method of pulling the victim in two and thus, at least, removing him from the bondage of the wire.

McCook has pointed out the fact that it is to the ants that we will have to turn if we seek the pioneers in massage, the Swedish movements, manicuring, and the kindred cleansing arts. He narrates most entertainingly his having been a spectator on several occasions when an ant was washing and making a toilet for a fellow ant. The care that they take of the immature individuals in a colony is as wonderful as it is necessary to the life of the growing youth. From the time when, by constant licking, the egg is made to increase very materially in size, and when by regurgitation the very young are fed by the workers, mouth to mouth, down to the last moment when the just emerged adult is gently aided in diverting himself of that close-fitting brown "undershirt" in which he is born and which makes freedom of movement impossible, all through the immature stages, the attention lavished on the youths of the colony is quite equal to that showered by a fond human mother on her children, and far in excess of that accorded to the wretched children of our slums. But it must be remembered that ants have progressed in their civilization far beyond the point where slums, and faulty drainage, unswept streets and unventilated rooms, would be tolerated. I seriously doubt whether in all ant-dom sufficient that is scandalous or socially suicidal could be found to keep a Formican Lexow Committee busy for one day.

Some pupæ that I was transporting when unpacked were found to be tipped, here and there, with minute tufts of some species of mildew, which was growing, not on the pupæ themselves, but on particles of decayed wood adhering to them. Knowing that they required immediate and most careful attention, I at once gave them to some adult ants, which, though of another species, quickly set about to remove the growth and all the foreign matter. They were prompt to avail themselves of a small tin of water that I placed near at hand, and it would have been a lesson in painstaking cleanliness, excellent for most nurses in our orphan asylums, to have observed with what thoroughness each of these pupæ was bathed and rebathed and then deposited in a sunny spot to dry. The bathers, having deposited their charges suitably, quickly returned with another ward to the water's edge, leaving the washed pupæ to the care of other workers who moved around on all.

sides, waving their antennæ at the most rapid rate, but not touching the pupæ with them. It appeared to me that this must have a fanning, and, consequently, a drying or evaporating effect, and I have no doubt that was its purpose.

I should much like to tell of the games and sports that it has been my good fortune to witness. Some of these have been well described by Huber and Forel, as well as by Bates and McCook; they are so marvelous and almost incredible as to need to be seen before they can be believed or understood. Our recording secretary,* a most ardent upholder of the claims of football, in the great scheme of the survival of the fittest, would, I know, be pleased to know how hazardously near to breaking all Rugby rules the little creatures occasionally come in an exciting contest.

So, too, for our corresponding secretary's† sake, I should like to describe the classes and complex courses of study or training that the youth of some colonies must needs be put through to fit them for the duties of the adult life. But time affords only the opportunity now to allude to another one, and the most interesting I think it to be, of the family characteristics of ants.

Naturally, being primarily a student of the diurnal Lepidoptera, I felt the most interest in the cow-herding habits of ants, because, in the tropics especially, the larvæ of certain species of the Lycænidæ are the commonest members of these droves of cattle. McCook has alluded to finding immature scale insects, aphides, and Lycænid larvæ all in the same herd of "ant cows." I have found herded within one nest two species of aphides, a scale insect, and the larvæ of Lycæna marina and Lycæna Pseudofea. Each variety of cow was left carefully by itself in a separate compartment, exactly as in the cases reported by McCook.

This ant habit was made even more interesting to me by the theories of Darwin and Romanes, which I quote. Says Romanes: "The facts show that the yielding of the secretion to the ants is, as it were, a voluntary act on the part of the aphides, or, perhaps more correctly, that the instinct to yield it has been developed in such a relation to the requirements of the ants, that the peculiar stimulation supplied by the antennæ of the latter is necessary to start the act of secretion; for in the absence of this particular stimulation the aphides will never excrete until compelled to do so by the superabundance of the accumulating secretion. The question, therefore, directly arises how, on evolutionary principles, such a class of facts is to be met; for it is certainly difficult to understand the manner in which this instinct, so beneficial to the ants, can have arisen in the aphides, to which it does not appear, at first sight, to offer any advantages."

Commenting on this problem, Mr. Darwin says: "Although there is no evidence that any animal performs an action for the exclusive good

* Rev. Dr. Geo. H. Hulst, the microlepidopterist.
†Archibald H. Weeks, Esq.

of another species, yet each tries to take advantage of the instincts of others"; and "as the secretion is extremely viscid, it is no doubt a convenience to the aphides to have it removed; therefore, probably they do not excrete solely for the good of the ants."

Only the fact that these students were theorizing on the discoveries of others, without any close acquaintance with the habits of these pastoral ants and their "cows," accounts for such glaring misapprehensions of the true *motif* of this whole wonderful interrelation of such widely dissimilar animals as we here find associated. Had either of these gentlemen taken a lady bug or any of the predatory beetles or Hemipters and quietly dropped it upon a leaf where some "ant cows" were feeding and being herded by ants, he would have gone far to open his eyes to the true explanation of this problem. Before one of the luscious "cows" could have been seized upon and bitten into by the beetle or bug a dozen ants would have been upon him and he would indeed have been a quick witted member of his race if he could have taken to wing ere they had maimed him beyond repair or even torn him apart. Then had either of these gentlemen taken a newly emerged ant and placed it upon a leaf where "cows" were feeding, but from which all the herdsmen had been carefully removed, and watched its examination of the "cow," with, perchance, a nip or two at the defenseless creature, and also noted how quickly the secretion was exuded by the "cow," he would have had yet other proof that the aphid is quite as much the gainer by the partnership as is the ant. If, furthermore, he could have watched, as have I along the shores of Laguma Enriquillo, in Santo Domingo, the ants in very considerable numbers carrying the larvæ of Lycæna exilis away from low-growing plants of the genus Cassia, which would soon after be entirely inundated by the rains, which even then had set in, he would not deem it more wonderful that these "cows" had learned to know and respond to their care takers than that the latter had divined that an approaching rainy season meant the drowning of their "cows" and a consequent dearth in the milk supply.

To me it seems quite as understandable just how the first aphides or other "cows" came to give off their secretions through pain in being bitten by predatory ants, which, in turn, learned that a live aphid represented a continuous food supply while a dead one was a meagre meal at most, as it is to understand how primitive man, far the inferior of the ants in general intelligence, came to induce cattle, sheep, goats, dogs, horses, and other of our domestic animals to yield to his early and barbarous rule.

Before closing I wish to state most emphatically that Sir John Lubbock is far off the mark when he states that ants, "with all their wealth of instinctive endowments, are utterly destitute of intelligent resources." It is a pity that on a comparatively few experiments on one species of ant, Lassius flavus, he should have based so sweeping a conclusion simply because that species afforded him no individuals capable of sufficient

resourcefulness to push a straw or paper bridge back into place, that otherwise inaccessible sweets might be reached. The observations of three naturalists, resident in the tropics, Ellendorf, Belt, and Kreplin, amply controvert this hasty conclusion. Ellendorf saw his ants push back into place a floating straw which they had been using as a bridge to get at food placed in the centre of a dish of water, after he had pushed the bridge out of place. Belt had the pleasure of witnessing the bridge-building skill on the part of Echitons in Nicaragua. And Kreplin has described the water-crossing art of Echitons on a small tributary of the Tocantins in Brazil so graphically that I cannot do better than quote his words:

"If no natural bridge be available for the passage, they travel along the bank of the river until they arrive at a flat sandy shore. Each ant now seizes a bit of dry wood, pulls it into the water and mounts thereupon. The hinder rows push the front ones even further out, holding on to the wood with their feet and to their comrades with their jaws. In a short time the water is covered with ants, and when the raft has grown too large to be held together by the small creatures' strength, a part breaks itself off and begins the journey across, while the ants left on the bank busily work at enlarging the ferryboat again." To this description I wish to add what has already been pointed out by a writer in the New York *Sun*, who observed it in the United States of Colombia, and what I also saw on two different occasions, once on a small creek near Puerto Limon, Costa Rica, and again near Cape Haitien, Haiti. In every instance these rafts were pointed up stream along the bank until they were sufficiently long enough to let the upper end drift out and by the force of the current be carried across to the opposite bank, when that end became the hinged one, and the first point, being released again by the water's force, was carried across, and thus all were safely over.

Sir John Lubbock needs but spend a half year in the tropics, needs but see one of the irresistible hordes of the warrior ants carrying everything before it, yet under perfect control from the head of the column, needs but see the serpent-like columns of the umbrella ants, a half foot wide and perhaps a half mile long, and needs but try, in either case, to thwart or divert these tiny creatures from their set purpose, to find that he was grievously wide of the mark when he conceived this to be a family of insects "utterly destitute of intelligent resources."

TYPHOID FEVER AMONG THE AMERICAN SOLDIERS IN THE RECENT WAR WITH SPAIN.

By Dr. VICTOR C. VAUGHAN, Ann Arbor, Mich.

(*From the "Medical Record." Second day of the 14th Annual Convention of the Association of American Physicians.*)

IN August, 1898, Dr. Sternberg appointed a board consisting of Major Walter Reed, U. S. A., Major E. O. Shakespeare, U. S. V., and myself, to study the causes and the spread of typhoid fever among the troops in the various corps within the United States. The members of this board have been and still are engaged in this investigation. The work is not completed, but the board feel justified in formulating certain conclusions. We have visited all the large camps in the United States, making direct personal inspections, studying the water supply, the quality and quantity of the food, and its method of preparation; the nature of the soil of the camp, the space allowed regiments, the arrangement and size of the tents and number occupying each one; the location of sinks with reference to the mess tent, the disposition of fæcal matter, etc. Medical and other officers were called upon for testimony, and then followed a study of the records of the Surgeon-General's office. Before we had concluded our first day's inspection at Camp Alger we discovered that there was one factor which must be dealt with, and that was the incorrect diagnosis of disease. Most of the typhoid fever was called malarial fever of a protracted variety. At once competent men were asked for and obtained promptly by Dr. Sternberg, to go to the various camps and make scientific examinations of the blood and apply the Widal test in febrile cases. As a result of these careful examinations it can be stated that malaria was a very rare disease among the troops that remained in the United States, not one case being found at Camp Alger and one at Chickamauga. There can be no doubt that reported cases of malaria were typhoid fever in almost every instance. This latter disease was covered up with other names; for in one command the death-rate from indigestion was put down as fifteen per cent., and other diseases were called dengue, gastric fever, which is the German for typhoid, also typho-malaria, etc. The infection was very general. Many of the volunteer regiments were infected with typhoid before they went to the Government encampments. More than ninety per cent. of the volunteer regiments were infected before being ordered there. Some brought the disease from home and some from the State encampments. How did the disease spread? There is no evidence that the water supplied in the larger camps was infected. At many places the soldiers and the citizens had their drinking-water from exactly the same source, and yet there was no typhoid among the citizens. It may be said truthfully that the spread of this disease was caused by the im-

proper disposal of excreta. The epidemic was not due to sending northern men to a southern climate; it was not due to the locality or to the massing of men in one place, but it was brought about by camp pollution. The men's feet carried the excreta, flies carried it to food, and thus it was spread. The only means of preventing a spread of infection is the complete sterilization of fæcal matter in camps which are to be occupied for three weeks or longer. An epidemic is demoralizing. The success of a campaign depends on the hygienic methods and precautions used. This could have in part been prevented had the Government been more careful in the selection of volunteer surgeons. Seven per cent. mortality in camps which should be hygienic is rather high. Many cases were called diarrhœa, and in about eight per cent. of the cases the patients had not been reported before that time, and thus the fever was far advanced before it was recognized. It is hard to break up typhoid fever in a camp even if it is moved, and even a sea voyage, as in the case of the Rough Riders, does not stop it altogether. Many cases were not recognized until they were convalescent at city hospitals.

Dr. Vaughan's paper was listened to with marked attention and received great applause.

SURGEON-GENERAL GEORGE M. STERNBERG said: It is certainly strange and very discouraging that after the lessons of the Civil War we should have a repetition of camp infection from a disease we know so well and recognize to be from filth. I had hoped for better things, that the profession in general would more fully appreciate the dangers. It was on April 25th that I issued a sanitary circular to all medical officers, pointing out the dangers in this regard, and explaining how infection might be avoided. Surgeons should appreciate the importance of camp sanitation, but the line officers were inclined to consider all talk about cleaning the camp, about flies carrying infection, etc., as a fad of the doctors, and did not recognize the danger until the epidemic had occurred. Doctors in civil life do not pay so much attention as they should to the sterilization of the excreta of their typhoid cases, and these were the men who made up our regimental surgeons. They were appointed by the Governors of the States and became responsible for the health of the soldiers and our camps. Typhoid invaded all the camps, even in the North where the regiments did not leave home. It does seem inconsistent that we should attempt to show the Spaniards how to eradicate yellow fever from their cities, while our camps are infected with typhoid fever. I can only hope that the results of this war may be impressed upon the profession, and that we may devise some way of avoiding similar disasters in the future.

DR. F. P. KINNICUTT, of New York, said: It seems to me that Dr. Vaughan has shown in a striking way the probable cause of typhoid in the late war, and unless medical officers have sufficient knowledge and power to enforce proper sanitary precautions in the army, I do not see how we can hope for anything better in the future. I had an invitation

to inspect the sanitary conditions at Camp Montauk, and I found that disinfection of the excretions from typhoid cases was exceedingly inefficient. At this camp the natural topography made the condition unfavorable, and I saw the camp cooks washing dishes at some of the numerous stagnant pools that abound in that neighborhood. I confess that camp sanitation is a difficult problem, but I believe that greater knowledge on the part of our medical officers and greater power given them would bring about better results.

DR. GEORGE L. PEABODY, of New York, said: It seems to me that this paper constitutes the most terrible indictment I have yet heard upon the general efficiency, or rather inefficiency, of the army surgeon, and it would seem quite in line with future progress to use it as a tract for distribution to the profession.

DR. STERNBERG: In reference to the Medical Department of the army I should like to say that we had an insufficient number of medical officers even for the small army of peace times, and when the call for such a large number of volunteers came, with the demand that they be put into the field immediately and thoroughly equipped, the medical force could not expand to meet the emergency properly. The adverse conditions at Montauk, for instance, should not be held against the Regular army medical officers. Most of the Regular medical officers were disabled in the Santiago campaign, and there were but few of them at Camp Montauk. The majority of the physicians there were contract or acting assistant surgeons appointed from civil life and serving with regiments.

DR. JACOBI: I do not know what the rights and duties of the Surgeon-General are, but he should certainly not be compelled to accept all the rubbish that might be sent him by an ignorant governor. If he is compelled to accept such appointments, it is about time something should be done to abolish such a practice.

DR. STERNBERG: I do not mean to say that those men who went with the regiments were below the average in the profession; they were no worse than many left at home whose large practices prevented their accepting such positions in the army. Most of the surgeons went home with their regiments in good shape, but their training had been gained at the expense of many soldiers' lives. The trouble was, these surgeons did not know much about sanitation, from their insufficient training in the medical schools, most of which pay no attention to sanitation and hygiene. The line officers were also in many cases to blame, for they ignored the surgeon's recommendations and said they would not pay attention to "doctors' fads."

DR. DOCK said that most of the volunteer surgeons went into camp with the expectation of fighting nothing but malaria, and in one regiment each man was provided with two hu dred grains of quinine and a three-ounce bottle of paregoric, with instructions to take some of each at the first signs of illness. Some surgeons gave us much as thirty to forty

grains of quinine a day, and did not recognize the typhoid case which was also suffering from an overdose of quinine.

DR. SOLIS-COHEN, of Philadelphia: I want to say a word for our volunteer regimental surgeon. It is a matter of record that Colonel Porter's regiment from Pennsylvania had almost no fever and but two deaths from any cause. This was due not only to the efficiency of the surgeons, but also to the efficiency of the line officers, who thoroughly carried out the sanitary measures suggested by the surgeons. I do not believe the responsibility for this awful disaster is upon the profession to the extent that the paper would imply, for I think with Dr. Sternberg that many of the line officers are responsible in that they considered all sanitary suggestions as medical fads.

DR. VAUGHAN said in conclusion: I am afraid there may be some misunderstanding as to what I said about the volunteer surgeons. I meant that the average volunteer surgeon was better than the average doctor in civil life. The point of the whole matter is that the medical officer is powerless unless the line officer will uphold him and follow his directions. I honor the graduate of West Point and Leavenworth, but I think it is a shame and a crime that the line officers of our Regular army have no education as to sanitary knowledge. The medical officers had hard work thrown on them, and they did it well, considering the difficulties.

THE AGONY OF THE ANTILLES.

BY C. E. P. B.

(*From the "United Service Magazine," May, 1899.*)

SURELY no fairer portion of the globe was ever visited by man than those islands in the Caribbean sea which Columbus, mistaking for the shores of distant Hindostan, already known to Portuguese navigators, termed the Indies. 'Tis a region of "sea-like skies, of sky-like seas." In it can be grown every product of the tropics, and its hilly regions offer an opportunity for the cultivation of European vegetables and fruits which has not been altogether lost. But a curse seems laid on these fair islands, the whole secret of the same being that the white race is endeavoring to carry on a hopeless contest against the climate, and yet affects to consider it as one that can be treated as a *quantité negligeable*. Now, although the heat in the West Indies rarely causes the mercury to rise above 100° F., and the mean temperature of Jamaica is 26.1° C. as against 28.5° C. at Calcutta, yet the enervating effect of the climate in the Antilles is most remarkable. It is true that the proximity of the sea renders the temperature uniform, but that is one cause of the climate's wearying effect; for neither by day nor night does any relief come, and a cold season is unknown. "I do not recognize the English race here," said the captain of a Russian man-of-war to

me at Kingston, Jamaica; and in those few words he summed up the situation. One does not, in the pale, quiet, dejected, indolent whites who inhabit the Antilles, recognize the British, Danish, or French races. The Spaniard, a bit slothful himself at home, becomes doubly so here; and the word *manaña* assumes a meaning even more intensely significant than it does in Spain.

Cuba, the Pearl of the Antilles, has suffered more intensely than the other islands. Possessing resources greater than any of them, she has not neglected them in the same way that Haiti has; but she has by constantly succeeding periods of war, time after time wrecked the previous progress made. The area of this vast island is 80,000 square miles, or one-fourth of that of the whole of Spain. Although only one-tenth of this was cultivated, yet the exports of sugar amounted in 1890 to £8,000,000; whilst tobacco, cotton, and rice were also largely exported. The question of government in Cuba was particularly difficult, and Spain and the Spaniards have been perhaps unduly abused for not succeeding in its solution. Previously to the Civil War or Rebellion, in the United States, Cuba was left pretty well free to act as she liked by her powerful neighbor. At its close the island became the principal slave-holding country in the world, and the battle of opinions which had been fought out forty years before in the islands under British rule had here to be fought over again. The Creoles, or native Cubans, now began to raise the cry of Cuba for the Cubans, and were styled the National party. The Creoles were large slave-owners, and strongly resisted the attempts of the Conservative, or Spanish party, to introduce the abolition of slavery. It is as well that this should be noted, as lately this party's own struggle for freedom has cast over it a halo of glory which a visit to the island and acquaintance with the Creoles very soon dissipates. The Nemesis of Fate denied to these whites later the freedom which they so long successfully refused to their own slaves! Yet, to say, that the Creoles in olden times did not possess freedom would be untrue. Captains-General ruled the islands, who, like the true patriots alluded to by an English poet, left as a rule "their country for their country's good." These enriched themselves at its expense, and took little but a social interest, and perhaps not much of that, in Cuba. But they did not interfere with the Creoles, except in so far as to maintain the dominant influence of the Home Government in the island. The action of the Creoles and the Conservatives in the question of slavery is at this period, I consider, very interesting, and I will quote Colonel Washington Eve's description thereof, he being a well-known authority on subjects connected with the West Indies.

"In 1868, after the downfall of Queen Isabella, there was a movement which might have tended in favor of republicanism or of the monarchy, and which for the moment was conciliatory amongst all parties. Neither Lersundi, however, the last Captain-General of Queen Isabella, nor General Dulce, who was sent by General Prim, was authorized to

settle the requirements of those who clamored for the Creole view of local self-government. During all this time the slavery question was a bitter subject of discussion, both in the colony and in the Cortes at Madrid. Upon this question the Peninsulars and the Insulars were at variance. General Lersundi could not control the volunteer battalions, who made themselves a great political and military power. They compelled General Dulce to quit the island. They even prevented the promulgation of the Moret Law for the gradual emancipation of slavery, principally on account of the fact that it was passed by the Spanish Parliament. Of the strength of the Peninsular and Insular parties—of the influence which they exerted (especially the latter) upon the black population—of the regiments of Spanish soldiers which were sent, and the thousands who died—no mention need be made here except, perhaps, to call attention to the strenuous efforts made by Spain in recent years, amid all her own political disturbances, to retain a secure possession of the island, and the enjoyment of its revenues. All these political items of variance have, however, been subdued in the last five or six years (1891), and a period of successful agriculture and export may be prognosticated for this magnificent colony. By the time its production of sugar reaches a million tons (it has sometimes reached three-quarters of a million), it will have been swamped (so some people say) by the Monroe doctrine, and will have become one of the United States of America. * * * What about its future? Will the class feuds subside now that emancipation has come, and the island settle down, without any further revolt, into the permanent possession of Spain, or will the stars and stripes replace the Spanish flag at El Moro?—a consummation which could no doubt be brought about by internal feuds, a chronic state of public bankruptcy, and a prospect of protective and differential treatment in the great Union of the West."

Truly Colonel Eves read well into the future!

At the time described, thirty years ago, there were then only two parties in Cuba—the Creoles or Nationalists, and the Conservatives. But the blacks who had been granted their freedom soon became a power to be considered. In a country where when the earth is tickled it promptly smiles, but little exertion is necessary to sustain life, and the indolent blacks were with difficulty induced to work. Gradually they settled, or squatted, entirely without any prescriptive right, in out-of the-way spots or in unfrequented places in the "bush" or jungle. Here they formed small communities of a lawless nature, which Ishmael-like turned their hand against all men. It was in the interest of the Creoles to propitiate them; for without their labor the sugar estates could not be worked nor the tobacco rows hoed, as no white man as a rule can work in the sun in these islands. The Spaniards petted and pampered the blacks in order to use them as a set-off to Creole influence. And in the end they became more powerful (owing to their inherent ferocity and lawlessness, not to their brain-power or capability for self-

government) than either Creole or Spaniard. Yet a fourth party was to make its existence felt, and to worry helpless Cuba. After the end of the rebellion many American merchants settled in the island, who gradually made its riches and resources known to their countrymen. These were honest men, and their dealings were a credit, and at the same time an advantage to Uncle Sam. But in the residuum of the fighting hosts of the great war were to be found many idle fellows, mostly of vicious habits and nature, who were only too glad to earn a dishonest dollar. Tampa, in Florida, became the headquarters of expeditions manned by these desperadoes, financed by cunning men in the North, who took care to remain unknown, and launched upon the Spanish colony. Cuba's long and indented coast-line renders it peculiarly favorable for such landings. A Cuban Junta sprang up later in New York, which was not ashamed to ally itself with these ruffians, the scum of population of North America. The more honest citizens of the United States, if not altogether averse to an eventual incorporation of Cuba into the Union, viewed with loathing the means taken to precipitate an end which they deemed inevitable, owing to the misgovernment of Spain and the internecine warfare in the island.

Recent events are so fresh in the minds of all my readers that I need not recapitulate the story of Spain's last most gigantic and most unfortunate endeavor to hold possession of Cuba. It may in truth be said that the Island was practically lost before the United States declared war; for the only manner in which the mother country held it was by her command of the sea. Once this had gone there was in truth a dearth of food in Cuba. It must be remembered that during the rebellion acts of violence were the rule, not the exception; quiet and inoffensive proprietors in the country, who simply desired to reside there peacefully and to enrich it by their industry, were reduced to ruin. For did they proclaim their loyalty to Spain, so surely would a negro band arrive some night, attack and set fire to their premises, carrying off or killing the inmates, or, if unusually mildly disposed, leaving them naked and homeless! If, on the other hand, Spanish troops were quartered upon them, they might await in vain any remuneration for the expense they were put to. The peaceful negroes were terrified and did not dare to work; the cane remained uncut, and ran to trash; the fruit and rice came to no better end. Only the tobacco, of which the best sorts are grown in the neighborhood of Consolacion del Sur and Pinar del Rio, about 150 miles west of Havana, remained to a great extent uninjured. This is owing to the fact that the rebels never gained a footing in this part of the island, which is narrow and swept by the healthy sea breezes. I do not wish to imply that tobacco cannot be grown all over Cuba, as is the case, but the soil and climate of the south-west portion is most favorable to its culture. The Vuelto-Abajo lies here, along the under features of the Sierra, away to Cape Antonio, and down to the palm-covered plain which stretches across the island from north

to southern shore. The *lomas* on the eastern slopes of the *cargos* produce the best cigar-tobacco; but in this favored district which is immune from the yellow fever, and in which water abounds, every planter's house abounds with good cigars. You will be offered a "veguero," or home-made cigar, here, which has only just been finished, and has a delicious smell. Its leaf is a *café-au-lait* color, and is covered with a soft and hairy down. The "veguero," or farmer, tests the leaf first with his finger, to insure that his guest may smoke a good specimen of his work. The plant is dried according to the fashion in color, and of late that has declared for light shades. The tobacco is sown in October, after the heavy rains, and cuttings are taken twice between then and March, the second being considered the best. In Cuba the plant never exceeds a height of three feet, and the leaf is smaller than that of the larger and coarser plants grown in Mexico, Jamaica, or South America. Fortunately for all parties in the island, the cattle which thrive on the sweet grass which grow so well in the Antilles, did not decrease in numbers during the fighting. They were, however, driven off in great hordes by the rebels into the the grassy mountain valleys, where they supplemented the ackee, the mango, and the orange as an article of food.

Without going, in any detail, into the reasons of Spain's want of success in her efforts to retain her possession, one may remember that the Peninsula is no longer the country which drove, perhaps unfortunately for her civilization, the Moors across her shores. No great statesman has arisen who, like Ximènes, has compelled obedience from grandee and peasant alike, or has ruled in the absence of a king. No great captain, like Consalvo of Còrdova, has been found to organize operations on distant shores. Spain has simply poured into fever-stricken Cuba hundreds of thousands of more or less weakly boys, led by officers, brave no doubt, but ignorant of the country, its climate, geography, or resources! The extent of the island, its mountain fastnesses, its want of railway communications, its execrable roads, its unhealthy marshes, and last, but oh! how awful in their intensity, its plagues of yellow fever and dysentery, have all been so many agencies warring against Spain and on the side of her enemies. For the rebels, consisting for the most part of black banditti, with, it is true, some Creoles driven to desperation among their ranks, were able to hide in the caves in the mountains at an altitude where fever is unknown. The numerous fruit trees afforded them sustenance, the stolen cattle replenished their commissariat, water was always at hand. From rock to rock they crept in the dense bush, where no European could follow them. The Spaniards, on the contrary, forced by their numbers to concentrate in the plains, lived under every sort of insanitary condition, aggravated, it is true, by their own want of precautions. Their hospitals became full, the morale of the healthy was affected by the sufferings of the sick. Medical attendance was but imperfect. The army would have been stronger had

its fighting ranks been reduced by one-half, and its ambulance and hospital staff multiplied by ten.

At last the end has come, and Cuba, *saignée à blanc*, has been handed over to the United States of America. Of course the Americans have a great advantage in the length of their purse, which will enable them to re-exploit the undoubted wealth of the island in a manner which bankrupt Spain could never have done. But of what real advantage will it be to add the star of the State of Cuba to the spangled banner? On closer acquaintance the rebels have already appeared to the Americans in their true colors, and even American energy and go will find it very difficult to overcome the inertia inherent in all the populations of the West Indian Isles. The negro citizen has not proved such an acquisition to the Union as to render his advent in new hundreds of thousands an unmixed blessing. And all the sanitary precautions ever invented may minimize the terrors of yellow fever and dysentery, but they will never drive these fell diseases altogether away from Cuban shores. Some of Uncle Sam's most cherished political opinions will have to be abandoned if he wishes to conciliate the natives of Cuba; and the few honest men remaining in it will not, in all probability, hail the Americans as deliverers at all. The question of what is to become of Cuba, whether it is to receive autonomy, or simply be absorbed in the United States, is not the least interesting one in the story of the expiring Antilles.

To those who imagine that the negro race, if left to itself and not interfered with, or tyrannized over by the white man, might be able to set up a satisfactory government of its own, Haiti offers an interesting picture. This was the first Spanish settlement in the West Indies, and contains the first mausoleum of Columbus in the New World. The Arawaks were the original inhabitants of this island, and as they gradually disappeared before the Spaniards, African negroes were introduced to take their place. Penn and Venables conducted an unsuccessful expedition here; and in 1665 the French took possession of the western part, whilst the eastern portion, renamed St. Domingo, remained a Spanish colony. Previously to 1790 as many as 65,000 tons of sugar were annually exported from the French portion of the island. During the Revolution the bloodshed and massacres initiated at Paris were most successfully imitated at Haiti. The French population was massacred by the freed slaves. Napoleon tried to recover the island, and Toussaint L'Ouverture, one of the few capable blacks who has ever existed, but whose licentiousness is a matter of history, after a brave resistance was taken prisoner to France, where he died. The French did not long retain possession, as the terrible climate of the plains killed off all their troops. Since then the government of Haiti has been a vast black burlesque, in which the ridiculous and the horrible have been blended. The "Emperor" Soulouque, with his "Ducs" de Marmalade and Limonade,*

* These titles were actually granted and borne in Haiti.

travestied a monarchy there some fifty years ago. Various Presidents, elected for seven years, but whose career is usually interrupted by rebellion, have enriched themselves at the expense of the Haitians. No railways exist in Haiti; Port-au-Prince, with its beautiful bay, is a sink reeking with impurities, a hot-bed of disease. It is computed that an outgoing President of Haiti who leaves it without a private fortune of two million francs is a rarity; and Sir Spenser St. John, our Consul-General at Port-au-Prince, reported only a few years ago, that cannibalism, in the shape of baby-eating, took place there. However, the inhabitants certainly traverse these allegations. What is more certain is that with every advantage of situation, with mountain ranges, almost every variety of climate, soil, and vegetation, with numerous watercourses and magnificent forests, this large island, nearly 400 miles long and over 100 miles broad, with an area of 25,000 square miles, possesses a population of, at the outside, only half a million! Its exports are valued at about £500,000, and its imports at a little more. Practically speaking it has no trade. It is also without railways, roads, bridges, factories, important towns, canals, or efficient police. On the other hand, it possesses a Constitution, two Chambers, a National Assembly and a Senate, and the blessing of universal manhood suffrage! It is, as Colonel Eves says, "in a chronic state of disturbance," and it is as a rule not safe for English passengers to land in other ports than the chief town. A friend of mine, however, landed at Jacmel, and made his way across the island to Port-au-Prince on mule-back without disaster, but with considerable discomfort. Colonel Eves says:

'Haiti has a large floating debt, created by paper money issued at various times, the value of which is much reduced by repudiation and forgery. Various financial operations, such as the establishment of the National Bank of Haiti in 1881, have taken place in recent years, but it cannot be said that the credit of the government has been improved, or the development of the country promoted."

In this, all who have ever seen its shores, or made acquaintance with its inhabitants, will heartily agree.

Of the Greater Antilles there remain Jamaica and Puerto Rico. Leaving the first to be presently returned to, we will glance at the history of the island that Juan Ponce de Leon, a gentleman of Seville, had such trouble in wresting from the wild and turbulent natives. It is 95 miles long and 35 wide. Although hot and visited by hurricanes, a breeze blows every day from the sea, which tempers the heat. The hills, valleys, woods, and meadows of Puerto Rico are beautiful, and it has not been altogether so abandoned by man as the neighboring island of Haiti; for railroads unite the coast-towns of Aguadilla and Arecibo to San Juan, the capital, and cross the interior to Guayama, Ponce, and German. It possesses, like Jamaica, a central chain of mountains, from which numerous streams dash foaming to the sea. The hills are covered with trees. It is, or was, an earthly paradise. On it roam

herds of wild cattle, and there are many mules. Among its products were rice, maize, plantains, pine-apples, oranges, citrons, lemons, melons, potatoes, and fine salt. The capital, San Juan, is on a small island joined by a causeway to the mainland, and was founded by Juan Ponce de Leon in 1510. Drake once left his card there; every vessel in the port being burned to "singe the Spaniards' beard." We took the island in 1598, and after despoiling it abandoned it. The Dutch attacked it in 1615, and so did we in 1742, but neither attempt was successful, and the island remained Spanish. To describe its beauty is beyond my power, but the beautiful lines of Tennyson in "Enoch Arden," may well be drawn upon to do so.

"The mountain wooded to the peak, the lawns
And winding glades high up like ways to Heaven,
The slender coco's drooping crown of plumes,
The lightning flash of insect and of bird,
The lustre of the long convolvuluses
That coil'd around the stately stems, and ran
Ev'n to the limit of the land, the glows
And glories of the broad belt of the world,

* * *

The myriad shriek of wheeling ocean-fowl,
The league-long roller thundering on the reef,
The moving whisper of huge trees that branch'd
And blossom'd in the zenith, or the sweep
Of some precipitous rivulet to the wave,

* * *

The sunrise broken into scarlet shafts
Among the palms and ferns and precipices;
The blaze upon the waters to the east;
The blaze upon his island overhead;
The blaze upon the waters to the west;
Then the great stars that globed themselves in Heaven,
The hollower-bellowing ocean, and again
The scarlet shafts of sunrise * * *"

And what has Spain done with this "Eden of all plenteousness"? She certainly abolished slavery so late as in 1873, but she has taxed all the industries of the island to such an extent as to lay an embargo on their development. The total sugar produce, which had once risen to 100,000 tons, has much declined, owing certainly to causes over which Spain had no control. So the island remained until it lately was taken by the Americans, a monument of Spanish misrule and neglect, with a commerce just sufficient to clothe and feed its 700,000 inhabitants, who subsist for the most part on salt cod-fish imported from Canada. The guns of the fortifications at San Juan appeared to the Americans as if they had not been used since the days of Drake and Léon. The island has been much used of late years as a sanatorium for sick soldiers from Cuba. In fine it may be said that, whilst Spain assured a certain tran-

quility and safety to life and limb in the island, in contradistinction to the neighboring Republic of Haiti, yet she failed to prevent Puerto Rico from marching on the road to decay, along which all the great Antilles have of late years been making their melancholy way. The two finest and most important islands of this group have now fallen by the right (?) of conquest into the hands of the United States. Backward their state may at present be, but when we compare them with our own islands, we may remember the proverb anent glass houses! To remove the crushing taxes on native products, to give a chance in the shape of a preferential tarift to the same, to insure civil and religious liberty and toleration, to improve the scholastic teaching, to better the execrable roads, to imitate and keep in repair the good bridges constructed by the Spaniards, to pour in capital so as to develop the resources of the islands, to institute a small but picked and reliable negro army and police commanded by good American officers, to create an autonomy in which the Creoles and more intelligent of the colored folk will have a say; to ruthlessly banish black banditti, white mischiefmongers, and wild speculators should now be the task of Uncle Sam. And for every dollar thus expended he may expect, with time, a hundred good pounds return!

Following the course of the setting sun the steamer of the Royal Mail Company makes from Jacmel, in Haiti, for Kingston, Jamaica. The gloomy La Hotte mountains frown down upon a moonlit sea whose oil-like surface the bow of the ship troubles with phosphorescent wavelets, laden with glowing atoms. The coast of Haiti is very beautiful. A succession of rolling hills of apparently igneous formation, clothed with an abundance of acacia and dwarf mimosa, roll down from La Hotte to the low cliffs that are washed by the sea. Not a human habitation, or path, or moving creature breaks the monotone. But if the eye wearies of the land-view the sea itself is laden with glorious memories. Off Tiburon did Rodney wait for many a weary day and night, and the Bay of Sharks, ill-omened name, was red with the blood of brave French and English sailors, after the memorable defeat of Ducasse in these waters. The moon sets behind us, and next morning we sight Morant's Point, Jamaica. From here our advent is telegraphed on to Kingston. Soon the Blue mountains loom beautifully indistinct above the fertile Parish of St. Thomas in the East, sugar fields intensely green, and pleasant homesteads dot the scene. Plumb Point Lighthouse, standing out white against the grove of cocoa palms on the Palisades, points the way to Port Royal, through the intricate shoals of "cays" or coral reefs, which furnish it with one of its best defenses. As we turn the point at Fort Charles (whose flat roof Nelson often paced in irritable expectation), Kingston lies right ahead, a scattered assemblage of houses, to which the amphitheatre of the Port Royal mountains makes a background beautiful indeed; whilst the middle distance is filled in by the fertile Liguanea Plain studded with apparently handsome residences,

and covered with a vegetation intensely green above which at intervals rise the waving tufts of the cocoanut and grugru palms. Peeping through the clouds which usually veil its massive grandeur, the Blue Mountain Peak, thirty miles from us, dominates the landscape from its stately altitude of nearly 8000 feet. From its summit on a clear day can be seen the Sierra Maestra, north of the bay of Santiago de Cuba, whence Cervera, hounded forth by idiotic orders from Madrid, made his gallant but futile dash for liberty. The only ugly feature on the prospect is the black and grimy wharf of the Royal Mail Company, and on it we discern an eager crowd waiting for our arrival. Ah! "ye gentlemen of England who live at home at ease," how little do you imagine with what feverish anxiety the mail is awaited, and how sweet is the news from home when 7000 or 8000 miles of ocean divide you from your native shores! The globe-trotter who only visits the tropics in the cool season feels no regrets perhaps 15,000 miles away from home. Let him pass a hot season or two in the plains, and undergo the toil and worry of getting into order what he finds so carefully prepared for his reception, with the mercury glued for three months to 86° in the coolest part of the house, and he will appreciate at its true value the yearning for home which Lord Eglintoun so beautifully expresses:

> "From the lone sheiling on the misty island,
> Mountains divide us and a world of seas:
> But still the blood is strong, the heart is Highland,
> And we in dreams behold the Hebrides.
> Fair those broad meads, these hoary woods are grand—
> But we are exiles from our fathers' land."

The impression which the traveller receives on landing at Kingston, Jamaica, very much depends upon the quarter of the globe from which he approaches it. If he arrives from Colon, after probably a voyage up the Pacific coast, touching at ports gradually decreasing in comfort and cleanliness, till discomfort culminates in the sordid stagnation of Panama, he will welcome the aspect of the town as a refreshing and cleanly change. But if it be from Europe that he first sets foot on the island, the generally untidy look of the town, with the John Crows, first cousins of the vulture, perched on each gable-end, awaiting tit-bits in the flow of the evil-looking black rivulets which course in fœtid sluggishness down the principal streets to the sea, its appearance will scarcely so favorably impress him. At all events he will be whirled along at a rapid pace in a fairly comfortable buggy, a movable flap in the hood of which secures the necessary ventilation. His route will lie through a thoroughfare lined with good shops, whose entrance is by a cool piazza, or covered gallery. A tinkling bell heralds the advent of a tramcar laden with a smug and sweltering crowd; at its approach the dusky Jehu will direct his animal apparently straight for the nearest shop window, and although the first impression is deceptive, yet the wrench will be so great as to precipitate the traveller either into one of

the Stygian streams above referred to, or to cast him, an unwilling teetotaller, into a lime-juice vendor's stall to refresh his thirst! Amongst other blessings imported from the States is the fashion of laying out the streets at right angles to each other, and as the town is built on a gentle slope towards the sea, the level of the streets leading to it has been lowered, by the natural drainage of tropical showers, considerably below that of those which run parallel to the shore. As a result, at each cross-road two awful jolts shake the crazy vehicle, and effectually banish what little good temper has been left in the passenger by the experiences of the Custom House, by the dust and the olfactory shocks to which he has been subjected. He is scarcely in a pleasant frame of mind, therefore, when he reaches his hotel, but as he turns in under the archway, festooned with a glowing bougain-villea some twenty feet long, the sight will do much to restore his equanimity. A splashing fountain stands in the midst of a carefully tended bed of crotons, allamondas, and palms, and as he drives along the freshly watered gravel, the dark arches under which stands the buxom hostess, civilly awaiting him, and the general air of sun-excluded coolness cannot fail to favorably impress him. After a plunge in a bath, in which he can almost swim a stroke or two, he will descend to a well-appointed table, the discussion of whose dainties will doubtless leave him in a contented frame of mind. And this is the condition in which, if possible, to approach the consideration of things Jamaican; since from food to lodging, from council chamber to trash-roofed country cabin, all are more or less disappointing!

But not so, a thousand times no, is gorgeous and beautiful Nature, which man's too listless hand has not yet had time to spoil! Few will remain longer, either in Kingston, busy and uninteresting, save that its parish church shelters glorious Benbow's remains; or adjacent Spanish Town, whose quaint old stone buildings, the barred windows and great doorways, recall Malaga or Granada, unless obliged to do so. Let us accompany these travellers who are just starting for a ride to the mountain estate of Cinchona, so called because it was planted with these beautiful trees just in time, with true West Indian fortune, to produce bark when quinine became a drug in the market! It is early morn, our route lies through the breezy savannah which surrounds the military headquarters, and the barracks of the famous and devoted black West India Regiment at Up-Park Camp. Already the soldiers are busy, either at drill or with their machetes, which every West Indian carries, cutting down the "bush," as the prickly dwarf-acacia and scrub is called, and which grows so rapidly as to require constant attention. Interspersed with it after the rains springs up rankly a plant with a pretty yellow flower, significantly styled Kill Buckrah.* Very picturesque looked the blacks in their sky-blue shirts, zouave trousers, and red fez; stalwart and broad of shoulder they worked, sing-

* Buckrah is the designation applied by the negro to the white man.

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ing gaily. The buildings here are massive and widely separated, to allow the air to circulate freely, and a church, hospital, swimming-bath, men's barracks, officers' residences, the whole carefully tended, set an example of tidiness and care which the civilian population of the island would do well to imitate. The sentry at the entrance gate, a gorgeous figure in white jacket, red waistcoat, turban, blue trousers, and white gaiters, would not have suffered in comparison with his comrades opposite Whitehall. Next comes the main road to Gordon Town, in excellent order, with a deep gully at its side to carry off the sudden rises of water during the rains. Indeed, the whole face of the country (the detritus from the mountains scored deep, and seared by these deep water-courses or nullahs) tells its own tale of the heavy downpours in the rainy season. The rivers, when they "come down," cause woeful destruction both to life and property. But of late years excellent girder-bridges, on high masonry piers, have been erected at the principal passages, and the mortality from this cause has been much minimized. Soon we enter a black limestone dale or cañon, which gives access to the under features of the mountains, whose lower slopes are of a vivid green, dotted with dark groves of mango trees and groups of feathery bamboos. At intervals we see a reddish scar, where a landslip has carried away some thousands of tons of earth, and which prolific Dame Nature has not yet had time to clothe in her verdant apparel.

At Gordon Town, about 1000 feet above the sea-level, and where the rainfall is about 85 inches as compared to 41 inches on the Palisades, the carriage-road ends. The mule-path bifurcates, leading to Newcastle on the left, whilst our road is to the right. Gordon Town lies at the junction of two valleys of extreme beauty; the quaint, wooden, shingle-roofed houses are surrounded by orange and lime groves, and the coffee plants with their white star flowers, grow close up to their walls. Over the road the giant cotton trees spread their black arms, and beneath them the hibiscus and plumbago alternate in profusion. The air is heavy with the perfume of stephanotis and gardenia, and the fiery poinsettias dart their scarlet rays from betwixt the motionless banana plants, whose leaves, waving over every corner which can be conquered from the rugged rock, form a delicious canopy of green. So high are the cliffs that, although our journey lies due east, the sun has not yet risen high enough to penetrate their chastened gloom; and the buzz of bird and insect life is all abroad, which will be dumb a few hours later in the noonday heat. Butterflies and moths that I cannot name, but which resembled flitting coruscations, hover around us, and beautiful humming-birds, equally dazzling in hue, dart among the shadows, thrusting their long delicate bills into great trumpet-shaped datura-flowers, till, "made faint with too much sweet," they retire to rest until the comparative cool of evening shall tempt them once more to flutter their musical wings.

Passing Petersfield, a well-cared-for coffee estate, we remark the bar-

becues, or masonry platforms for drying the berry, and soon reach Guava Ridge. This is the divide which runs down from Catherine's Peak, whose sugar-loaf summit, nearly 6000 feet high, occasionally appears, and here we must descend again. An hour's ride brings us to the picturesque village of Mavisbank, charmingly situated on a rock overhanging the romantic Ayala valley. We halt here to water and rest our horses, for it is now ten o'clock and the sun is beating fiercely on us. "Plenty of shade, Buckrah, in Pimento Grove," says our guide; and in truth we are not sorry to hear it, for the poinsettia bushes, though fifteen feet high, form but an indifferent screen. Beyond, the Blue Mountain Range rises in verdure-clad grandeur. In each successive zone of altitude the character of the vegetation changes, but even the highest peak is decked with green. The clouds roll in masses round the giant hills, now parting to disclose an emerald peak in a turquoise setting, again enveloping their forms in a misty covering of grey. "Plenty rain up dere, sah! get on quickly now!" So we mount again, and wading the rock-strewn waters of the "Yalla" River, plunge into Pimento Grove. The fragrance of the trees is refreshing, and beneath them the ferns grow in dense profusion. They find here a climate suited to their freest fancy, their roots being bathed in moisture, whilst the cloud-bath frequently envelops them, leaving every frond shining with diamond drops of moisture. We noticed numerous adiantum and gold and silver ferns, and now and then, in a cleft formed by a mountain stream, and shaded by a mass of foliage—mango, mahogany, bamboo and pimento—we came on the haunt of those, the most beautiful of their tribe, the feathery filmy ferns. Our road became steeper and narrower at every step, as it wound around the mountain-side; above us rose almost perpendicularly the shaly rock, and on the other side, 500 feet below us, roared a mountain torrent that we could not see. One shuddered to think what the result of a false step of our ponies would be; but our fears on this score were unnecessary, as these sure-footed beasts are thoroughly accustomed to their work. The only danger lies in the edges of the path giving way, which is not infrequent after heavy rains, or in one's being unceremoniously hustled over the precipice by an approaching team of mules laden with coffee barrels. These obstinate brutes pursue their way with relentless regularity, and if you meet them your best chance is to throw your leg over your horse's withers, sitting perfectly still and trusting in Providence. Fortunately, there are no coffee plantations on the upper Cinchona road, and so we met none of these unwelcome travellers.

We issued from the wood at last, and now another enchanting panorama unveiled itself to our delighted eyes. The whole valley of the Yallah, its hills in curious igneous irregularity formed, lay before us, winding to the distant sea. The horizon appeared very high, and proved to us that we must be thousands of feet above the sea-level. The vegetation became more sparse here, but the whole mountain-side was covered with begonias. Though their blossoms were not so large as

those of the carefully attended hot-house varieties, still the freedom and strength of growth, and above all, the mass of bloom extending for hundreds of yards up and down on either side, made a sight bewitching indeed. Another turn of the road and the sight of conifers proved that we were approaching the Government plantation. We opened a little white gate, and were charmed to behold a trim-kept English garden, with green lawns, geraniums, calceolaria, petunias, and other familiar friends; and in a moment we arrived at the front door of the building tenanted by Mr. W. Fawcett, head of the Botanical Department in the island, who has done so much to improve the knowledge of his science there, and who offered us a truly West Indian welcome.

If the picture of nature is pleasant, there is nothing more melancholy than to come across, in one's rides through the luxuriant and beautiful "bush" in the plains, the ruins of a coffee-planter's abode! Huge girders and distorted masses of rusty iron-work rear their gaunt frames among the green leaves and above the rotting heap which represents what was once a trim and well-kept abode. Here and there a tree, sown by some bird, rises among the ruins, and those two white posts are jambs of the door through whose ever-open portals so many guests in happier days were wont to enter. All around the vegetation has grown —over courtyards, stables, slaves' quarters, wash-houses. Down to the left a thicker growth hides the old trash-house, where the remains of the cane, from which the juice had been expiscated, were thrown. Here lie the remains of the latest forms of saccharometer, vacuum-pan, retort, and boiler, over which so many discussions arose, and which were brought out at such vast expense from England. There, where the John-Crows congregate round the remains of some dead beast, were the open smiling cane-fields, green with the tasselated plant, in which the gangs of slaves, with their machetes, toiled, singing from morn to sunset. This pile of rubbish was the overseer's house, not by any means always as brutal as Legros, but often a gentleman of intelligence and capacity. There is no sound now in these solitudes but the melancholy shriek of the black parrot; and where once all was animation and bustle, that shyest of shy birds, the scarlet tanager, now watches at the nest of his more dusky mate. At nightfall hundreds of bats and vast winged moths issue from the ruins, and at times the great white owl, beautiful and ghost-like in the silver rays of the moon, sweeps down on them in search of food. Verily, all is desolation and ruin, so far as man's handiwork is concerned; only does Nature, with tropical prodigality, clothe in lovely forms the rotting remnants, and prove that with her is no death, but simply ceaseless change and birth ever new.

The reason of the ruin of Jamaica and the sugar islands in British hands was that in them the liberation of the slaves was declared and passed in a day; whilst in the foreign islands the abolition of slavery was of gradual growth. The planters, stunned by the change—for labor, once so cheap, became all at once almost impossible to procure—

and not being of that stamp which faces ruin and sorrow with energy, collapsed. It was only after a lapse of nearly half a century, and after the abortive rising of Gordon against our authority, that some governors, more energetic and thoughtful than their predecessors, strove to help the island from its slough of despond. Among these good and energetic men may be mentioned Sir Henry Norman, and above all, Sir Henry Blake. Under the *régime* of the latter the exports and imports increased, the fruit trade from the Northern ports with New York, which has since grown to such respectable proportions, was initiated. But some things are beyond the power of man, however capable, to cope with. Only a few months ago we were startled by the news of that terrific hurricane, so appalling in its intensity, which swept over the islands of St. Lucia, St. Vincent, and Barbados. These disastrous hurricanes are, however, recurrent, and every year they are feared and expected; thus runs the popular distich—

> "June, too soon; July, look spry;
> August, you must; September, remember;
> October, all over."

September, indeed, has given cause by which to be remembered! In spite of the recent grants in aid of the colonies suffering from the depression in the sugar industry, the leading sugar-planters of Jamaica decided upon sending a memorial to her Majesty claiming their rights as subjects of the queen, who are victims of unfair foreign competition, and protesting against being sacrificed to what they term "political fads." The memorial concludes with an expression of the unchanged loyalty of the sugar-planters to her Majesty. Be that as it may, no one who has been to Jamaica is unaware that there exists a large party amongst these same sugar planters which is in favor of, and openly advocates, an entry into the union of the North, trusting to a preferential tariff in their favor on inclusion into the United States of America. At the sugar conference held at Bridgetown, Barbados, on the 5th September, the following resolution was unanimousiy carried:

"This meeting of delegates from British Guiana, Trinidad, Jamaica, Barbados, and Antigua, whilst fully recognizing the efforts of the Right Hon. the Secretary of State for the Colonies to afford relief to the West Indian colonies suffering from the serious depression of the sugar industry, regrets that, so far, the attempts to arrange reciprocal relations between the United States and the West Indies, as well as to obtain the abolition of the bounty system, have met with no success. This meeting would strongly urge upon the British Government that nothing short of the speedy rehabilitation of the sugar industry can restore prosperity to the West Indies and British Guiana; and they respectfully demand, as British subjects, the right to compete in the home markets at the natural cost of production with sugar imported from foreign countries, and urgently call upon her Majesty's government, as the only effective remedy, to take such steps as will either prevent the importation of all

sugar on which export bounties are given, or annul by counter-vailing duty all the advantages derived from such export bounties."

That is the strongly expressed view of the sugar planters; but it must be remembered that they, numerically, although in culture and influence most weighty, are only a minority, and a very small one, in the Greater and Lesser Antilles. Yet, no doubt, all would much benefit by the recrudescence of the sugar trade and its attendant prosperity. But will the millions at home, the consumers, who, after all, have benefitted by the system which has reduced the price of sugar below remunerative value to the producers,—will they regard with anything but indifference the woes of those whose misery ministers to their comparative ease? This is a difficult question, which I am not able to answer; but there can be no doubt that the whole of the Antilles are now turning, some willingly, some otherwise, towards the United States to help them in their agony. And if Britannia declines to help them, Columbia can scarcely be blamed if she steps in to fill up the gap which her ancestor has vacated in her favor.

THE DOUBLE-COMPANY SYSTEM IN BATTALIONS.

By Lieut.-Colonel R. L. A. Pennington, Northumberland Fusiliers.

(*From the "United Service Magazine," London.*)

I THINK that in the present day a large proportion of officers fully recognize the value of the present regulations which provide for the drill and general system of instruction of the infantry. There is naturally a small body still remaining which views with suspicion and dislike the necessary changes which have been introduced in recent years; this section, no doubt, has its uses.

Of late years the requirements of training on modern lines have been considered with great care, and our regulations now deal so explicitly and completely both with subjects to be taught and system of teaching, that it would seem reasonable to expect commanding officers, who accept and follow the spirit of the instructions, to produce units in a high state of all-round efficiency. I am, however, not altogether convinced that this desirable state of affairs rests entirely in their hands; their power of working out, and of guiding others in working out, the regulations to a satisfactory result is limited by the present battalion organization. The special aim of the present-day system of training is to place the education of companies as completely as possible in the hands of their immediate commanders, to teach captains to accept responsibility, and to develop their judgment and initiative so as to fit them for duties in the field which they alone are able to carry out—in short, to decentralize command; further, to instruct a large number of all ranks in special duties.

To make clear the point I am aiming at, which is to show that with an organization of eight companies modern training is not easy to carry out satisfactorily, and that with four strong companies considerably better work could be done, I will refer shortly to the regulations which deal with our infantry training.

The Queen's regulations are now unmistakable in regard to the duties of a captain of a company. He is to be in all respects the commander of his unit. The training of recruits has been taken entirely out of the hands of the adjutant and of the battalion drill-instructors, and handed over to him; his prospects in the service are made dependent on the success of his teaching and method. He is responsible for the complete training in arms of his men, and for the maintenance of effective drill instruction; it is further enjoined that all exercises with the soldiers' personal weapons should be practised by companies, and very seldom at battalion parades. Nothing can be more satisfactory than this, or more on the lines of present day requirements; but a very essential factor in the scheme is that the captain should have his company at his own disposal on a sufficient number of days in a month. The out-of-date adjutant's drill has disappeared, and the curious old custom of working up a review firing exercise, physical drill, and the bayonet exercise for a lengthened period in battalion for production at the G.O.C.'s inspection by the second in command and adjutant can now be placed on the shelf with all respect that may be due. A remark made to me not long since that to allow captains to drill their own companies "spoilt the battalion for the adjutant" has now lost any point it may have been supposed to have.

The duties of commanding officers and captains in respect of the military education of their subordinates, the training in musketry, in range-taking, in reconnaissance, in machine guns, in mounted infantry duties, in gymnastics, in signalling, and in many other branches of instruction are carefully detailed, and it cannot be said that any of these many and various subjects are superfluous or other than entirely necessary.

The infantry drill of 1896 has placed all matters connected with action in the field on a thoroughly sound and modern footing. That its teachings are not yet universally accepted, I am aware, but its adverse criticism comes, I believe, entirely from those who have not accepted it, and have not worked on the lines it lays down. In practice those who do not either strain or violate its principles find excellent results. Personally I have the strongest regard for what I consider to be the enlightened and thoroughly workable principles contained in it, more especially for those which have given to the captain of a company the free hand which is absolutely essential to him if things are to go well in the field. Once launched in an attack, it is he alone who decides when to move, when to wait; it is he who decides on pace, on class and quantity of fire; he is concerned with leading, direction, fire control, dispositions to meet unrehearsed

situations, assistance to other companies, and much other detail which is beyond the power of a battalion commander to consider and direct. The Infantry Drill tells us that success in war must depend on the intelligence and self-reliance of subordinates; that responsibility which formerly rested with superior officers must now be delegated to juniors; and that habits of self-reliance and discipline must be developed during peace if they are to make themselves evident in war.

It is clear what is expected of the captain, and very plain that he must have means to fit himself for his duties, and to train his company up to the standard necessary to enable it to take its place in the battalion. But these cannot be afforded to him at present as fully as is desirable.

It is impossible to insist too strongly on the importance of the most thorough instruction of companies by their own commanders in all preliminary detail of action, movement, and control of fire in the field; this must be given to the company on the barrack-square, in the barrack-room, and when acting alone. Such detail should not, and cannot be taught by a commanding officer to his battalion as a body; it is the attempt to do this which is chiefly answerable for his presence in the wrong place—that is, in the firing line, and for his interference with companies engaged in an attack, which is constantly censured, and rightly so. The duty of the commanding officer is to organize and supervise instruction by companies, and if he is able to do this throughout the year he will be in a position to attend to his own special duties when his companies are working under him in an attack, and his interference to remedy a host of minor shortcomings will not be necessary. But if a commanding officer finds that the present organization in eight companies prohibits his giving to his captains sufficient opportunity to instruct their units, he must be greatly tempted to seize one of the few chances available of teaching detail, and this will lead him into the firing-line. When he gets there he will probably do more harm than good.

I have read, and I have heard it remarked by officers of rank in India, that camps of exercise are often less instructive than they should be, for the reason that a G. O. C., instead of finding himself free to consider tactical requirements, and to criticise the application of general principles, is often forced to attend chiefly to minor matters of instruction which should have been perfected by battalions in their own stations. This is perfectly true; but I do not altogether accept the reproach for the commanding officer or for the captains, but lay it at the door of the present eight-company system, which affords insufficient opportunity to the commanding officer and to the company commanders. Companies in India are stronger than at home, but it is often impossible to find eight officers of sufficient service and experience to thoroughly train them.

The musketry regulations, again, deal with the special duties of a

captain. He is responsible that his company is kept in efficient shooting condition, and that his non-commissioned officers are always efficient instructors. He is charged with the musketry drill of his men, with the first training of lance-corporals, and with other matters.

From the foregoing short summary of those portions of certain regulations which bear on the duties and responsibilities of captains, it will be evident that if these officers are to carry out the spirit of the instructions, and if they are to be judged on the result of their work, it is a *sine qua non* that they must be fitted by service and experience for their work, and especially that they should be afforded ample means of doing justice to themselves and to their men. A system which calls for careful training in every branch of a soldier's calling, and which demands that both recruits and trained soldiers should be educated by their immediate commander in all matters, is an admirable one, and an essential one if battalions are to be efficient at all points in the field; but if the requisite opportunity is clearly lacking to enable that system to be thoroughly applied, it is apt to lead to an irregular and perfunctory training, and to engender a feeling that the impossible is asked for. An officer, perhaps intelligent and keen, who finds that a long and often very ragged day's work will keep things going fairly, but will leave no sense of finish or polish, is apt to lose interest and pleasure in his work. It will be a serious misfortune if a feeling of *cui bono?* takes root amongst really professional soldiers, and it bids fair to do so.

The main question is, under existing conditions, can a battalion furnish at all times eight officers qualified to train companies up to the required standard, and can these officers be given sufficient opportunity to instruct? I should reply that this is certainly a serious difficulty. A great deal of labor, much high pressure, and a constant scramble, added to some use of putty and paint to conceal faulty work, will enable a standard to be reached that may pass muster, but the best results will not be attained. It is necessary to consider means to change this undesirable and uncomfortable state of affairs, and in my judgment the remedy will be found in the double-company system.

I will speak first of the drawbacks of double companies. I have discussed the question with many officers at home and abroad, when I have had the opportunity, and I have not yet been fortunate enough to meet one who could show me any serious disadvantage. Lieut.-Colonel Sisson Pratt, in his text-book on tactics, remarks that the position of the commander of a strong company is obviously one of greater responsibility than that of the captain of a weak company, and therefore likely to train him more rapidly for higher command, and goes on to say that it seems preferable to maintain the weaker organization that gives a large number of regimental officers to control the widely extended lines of a modern fight. With the former remark all will agree, but the latter infers that there would be fewer officers with a double company than with two of the present eight companies.

But such reduction of officers could hardly be contemplated by the most pronounced economist, although at times it is true that economy is considered before efficiency—a mistake which has before now led to a lavish expenditure to retrieve disaster.

It has been said that the double company is too unwieldy a unit for one man to command in the field, that 100 men on a front of perhaps 100 yards are as many as one captain can control, and that to double this number would make his task impossible. Every one is aware that one man alone cannot control a front of 200 yards in the field; he would not attempt to do so. There is no reason why a double company should occupy such a front, unless under quite exceptional conditions; usually questions of depth would limit the front to reasonable proportions.

I have never heard or read of any other objections to double companies, and it would be interesting to know of any which may exist.

I will speak now of what appear to me to be the advantages of four double companies, as compared with eight single companies.

The organization in double companies would, I believe, remove at once the feeling of incompleteness and want of finish which now exists. The depleted condition of many battalions at home, clearly contemplated and apparently definitely accepted, must militate against effective training for war, and the standard one would wish to reach may be difficult to arrive at, but it will be rendered considerably easier of attainment given four companies instead of eight.

With eight single companies, often very weak ones, and with a varied programme of duty to be performed and instructions to be carried out, I do not believe that it is possible to give captains anything approaching the opportunities for training which are absolutely essential to them. For a considerable number of months in the year the few files standing on parade can be employed usefully, no doubt, but no progressive system of instruction by captains is possible. At such times a sufficient number of men can be given to their commanders only by striking companies off duty, and to do this so that each company is off duty for only three days in a month, which is quite insufficient, is not always easy to arrange, and is often impossible. Circumstances constantly upset the most careful arrangements to get a certain training carried through. Even with battalion parades cut down to the narrowest limit captains can seldom get at their men except during the short three weeks allotted to military training, and the consequence is that much important instruction is slurred over, and the spirit of the regulations is not carried out. In certain matters battalion arrangements must be made to relieve the captains of duties clearly laid down to be performed by them alone, but which they have not the means of carrying out.

One expects, occasionally, to have to make bricks without straw, and the double-company system may not completely dispose of every one of the captain's difficulties, but it would certainly place matters on a far more satisfactory footing; he would at most times have a sufficient

number of men to make instruction of some value, and to provide him with interest, and this, supplemented by occasionally striking his company off duty, would give him the required opportunity for systematic training. He could then be expected to perform the whole of the duties which the regulations charge him with without battalion assistance. His responsibilities would be increased (and his powers might be increased in proportion), greatly to his own advantage and to that of the army. The value of responsibility in bringing out the best points of a man, and in fitting him for command, is especially evident to those who are acquainted with the system of the native army in India, and the class of officer it produces. Any system calculated to give greater scope to captains in our service would be of particular advantage.

The professional prospects of the captain are now made to depend on the manner in which he instructs his recruits, as shown by the general proficiency attained by his company, and it may be said that the training of recruits is the most important duty that a battalion at home has to perform. Under the old battalion system three or four drill instructors met all requirements, now each company has to provide its own.

Theoretically, all companies are not drilling recruits at the same time; in practice a number of them are, and all must keep one instructor efficient and train a second. Often a company has to provide one for drill, and at the same time another for the rifle-range. The situation is decidedly a difficult one; really good instructors are heaven-born, and are not made in this world; fair instructors are by no means easy to find, and the captain of a weak single company has very little material to select from. The result is that the recruits often suffer seriously. It may be said that the officers themselves should instruct: certainly they should; but the small number often present have many other duties, and need a competent staff to assist them. With double companies there would be a great saving in material, half the number of instructors would be employed to train the same number of men, and these could be selected from double the present number of non-commissioned officers. It should not then be difficult to find the required number of really competent instructors.

The captain of a single company must, at present, suffer from lack of a qualified instructional staff. His color-sergeant, good man as he usually is, has a heavy round of clerical and barrack-room work, lightened, doubtless, in some cases by system and the habit of time economy, but always heavy and requiring close attention if things are to be thoroughly well done. Exceptional men are able to combine pay and office duties with those of the drill-ground, but these are rare. The color-sergeant of a single company cannot be counted on as a regular drill-instructor, but the amalgamation of two single companies will place two color-sergeants at the captain's disposal, the one to conduct all clerical work, the other to act as permanent instructor in all drills. Such an arrangement seems in every way desirable, and, joined to the increased

facility for selection that double the number of non-commissioned officers gives, the captain would have little trouble in providing for his needs; in fact, the first training of company drill-instructors now performed by the adjutant might well be carried out by companies.

The advantage of double companies would be as great to the commanding officer as to the captain. He would deal with four responsible senior officers, instead of, as at present, with eight of all grades down to very junior second lieutenants, and his command would, in consequence, be greatly facilitated.

With eight companies circumstances make it often impossible to count on more than one officer with each, which renders it difficult for a commanding officer to secure the attendance of a company commander when wanted. This, added to the youth and inexperience of some of them, leads to constant dislocation of the battalion system, to delays and deadlocks. Some of the eight companies are frequently commanded for considerable periods by quite junior lieutenants, or by second lieutenants; these have not the experience or training to fit them to carry out the duties of a captain. It is necessary that an officer should be always present to answer for his company at the time the commanding officer is in barracks; but this is now constantly impossible. The solitary junior officer in command is, perhaps, when wanted, counting coppers in the canteen, undergoing signalling instruction, instructing a class in reconnaissance, sitting on a court of inquiry, or attending to some other necessary work. The commanding officer and second in command may daily see much in their travels round barracks, or in the office, which requires attention, but any sort of immediate action is often out of the question. Under the donble-company system it would not be difficult to arrange for a major, captain, or senior lieutenant to be always present. No combination of circumstances should then leave any of the four companies to the charge of an inexperienced officer, and as the four commanders would have at least one other officer present to assist, they would themselves be available when wanted by the commanding officer. Under such conditions work could be done out of hand, and responsibility could be fixed.

The constant change of command which now occurs in companies is a disadvantage; under the proposed system there need be no reason why a company should ever be commanded by any but one of its own officers. The present establishment would give one major or captain to command, with a captain and four subalterns under him.

It is necessary to practice in peace what we intend to carry out in war; but this principle is not followed when, as must now be the case, the captain of a depleted single company is trained to work, year by year, on a frontage of—at the outside—fifty yards in an attack (and ordinarily he may think himself fortunate if he has enough men to spread over such a front), and is suddenly launched into action with a company at war strength, requiring a front of some 100 yards. This is

a point which is little considered, but it is nevertheless of extreme importance; captains, half-company and section commanders, accustomed to be in close touch in peace, and working accordingly, will find themselves very much abroad when that easy proximity disappears on service in the field at war strength. With a double company a much nearer approach to reality is possible; in war the half would act as a reserve, and if in peace it were sufficiently often used to extend the front of the firing line, a war frontage could be simulated.

I might perhaps here make a digression, and remark that in the German army a company at peace strength (120 men) is made to occupy the same frontage for attack as it would in war with 250 men; thus not only are leaders accustomed during peace training to observe the actual war-front, and to arrange for control over its full extent, but sufficient intervals are afforded to enable reserves to be pushed into the firing line.

In our service all mention of casualties is now omitted from the drill-book, and as the frontage of a body is practically proportionate to its strength, no room can be found for the reserves, unless by special arrangements. In the above respects we might with advantage accept the German system.

Smartness under arms, steady elementary drill, discipline, and the utmost regularity and precision in detail, are qualities which have increased in importance in proportion as extended formations and independence of action have become more and more essential; it is, however, a question if these qualities can be maintained even up to the old standard under the present organization. It seems even possible that there may be a regrettable but unavoidable falling off unless an altered system gives company commanders the means of fully attending to such requirements.

It would probably be of advantage that the officers commanding double companies should be mounted. The disadvantage of this would be expense to the State, but the advantages should counterbalance it. They would then be more readily in touch with the commanding officer in the field, their services mounted would be of value in performing battalion scouting duties, and they would also be better able to perform their instructional duties in the field; further, as much of their work must often commence when the physical labor of the day is over, it would be well to keep them fresh for it.

In conclusion, I am aware that it is not difficult to frame an *ex parte* indictment, and to overlook facts which might be apparent if a question were viewed from a different standpoint, and it will be interesting to me to be given the bearing of a spot from which another view of this particular subject can be had.

ON THE SANITARY METHODS OF DEALING WITH EPIDEMICS.

By Professor J. LANE NOTTER, M.A., M.D.

(*From the Professional Papers of the Corps of Royal Engineers.*)

THE prevention of epidemic diseases is the subject of my lecture this evening. It is one of first importance to the British army, and inasmuch as foreign service in peace, as well as active service, is almost entirely in tropical and sub-tropical countries, I shall deal chiefly with the conditions met with in the tropics and with armies either on service in the field or at stations abroad.

At home recent legislation has given rules which are applicable not only to civil, but also to military life, and which are summed up in the three principles by which epidemics are controlled, namely, notification, isolation, and disinfection. The old system of quarantine against the invasion of cholera and other epidemic diseases has been replaced by the much more efficient methods of medical "observation."

There are two kinds of precautions which may be used against the introduction of epidemic diseases into England: first, if possible, to prevent the entrance of the contagion; and secondly, if the contagion be present, to annihilate as far as possible the circumstances which favor its spread. Subject to one qualification, which is not an important one, it may, I think, be accepted as certain that quarantine, conducted with extreme rigor and with the precision of a chemical experiment, will keep any epidemic disease out of every part of Europe in which the extremely difficult conditions can be absolutely fulfilled. On the other hand, a quarantine which is ineffective is a mere irrational derangement of commerce; and a quarantine of a kind which insures success is more easily imagined than realized.

Only in proportion as a community lives apart from the great highways and emporia of commerce, or is ready and able to treat its commerce as a subordinate political interest—only in such proportion can quarantine be made effectual for protecting it.

In proportion as these circumstances are reversed, it becomes impossible to reduce to practice the paper plausibilities of quarantine. The conditions which have to be fulfilled are conditions of natural seclusion, and fulfilment of such conditions by England would involve fundamental changes in the most established habits of the country. The whole tendency of English opinion and the basis of all recent legislation has been to look to measures of sanitary improvement as the best prophylactic against cholera and other epidemic diseases.

All our wars—and fighting has been the normal condition of the British army during the last forty years—have been in warm climates, and it is especially on active service that the effects of, and the difficulties of combating, epidemic diseases are greatest.

There is one important factor which meets us at the outset of our investigations—the distribution of disease. In like manner as there are fauna and flora proper to the tropics, so are there diseases. Each country has its destructive diseases, for diseases, like plants and animals, can only flourish within certain geographical limits. In the tropic isothermic zone we have China, Malay, India, Afghanistan, Persia, Arabia, Abyssinia, the Soudan, and Ashanti. Within these limits of temperature the British army has fought the campaigns of China, Abyssinia, Looshai, Ashanti, Malay, Duffa, Afghanistan, Egypt, and the Soudan. And within these limits are to be found the worst forms of malaria, cholera, yellow fever, dysentery, typhoid fever, typhus fever, and relapsing fever.

And as we merge into the sub-tropics we find the continued fevers giving place to intermittent. Now the geographical distribution of disease must be a most important element in service in the tropics; for, by knowing what to expect, we are in a certain measure forearmed. Take, for example, dysentery; by insuring wholesome food, solid and liquid, we can remove all causes of irritation from within, and by proper clothing we can protect from without. Again, the matter of conservancy; by insuring the absence of putrefaction from the camp or barracks, and the burning or proper disposal of excreta, we cut the ground away from the feet of cholera, enteric fever, and yellow fever.

Lastly, it must be borne in mind that all diseases, however trivial elsewhere, become serious in the tropics.

Much has been said and written with regard to the action of "climate" in tropical and sub-tropical countries.

Within a measurable limit as a primary factor it is nothing. A prolonged residence in a hot climate doubtless deteriorates the system. It is the duration of heat, and not the intensity, that is the determining cause of such deteriorations. The energy of the Anglo-Saxon who has been long resident in the tropics suffers; but as regards foreign service, the element of time is on the side of the British soldier, for the period of service is hardly long enough for him to be seriously affected. By proper selection of men, by reasonable food and clothing, climate may be relegated to a secondary place. And as regards the influence of "climate" as a direct etiological factor of cholera and enteric fever, such a causation is dangerous in practice as it is baseless in fact. Hygiene will deprive tropical climates of their lethal weapons—we can actually prevent the special diseases which cause so large a mortality in the tropics; and, if so, we have only the fact left that our men in the tropics are acting under a temperature which is not their best. We cannot indeed, hope that the European soldier will become so adapted to the environment of the tropics as to raise his standard of health, but we can at any rate neutralize to a great extent, if not entirely, the effects of this rise of temperature of the environment.

I propose, in the first place, to indicate the steps to be taken to pro-

cure a healthy environment to the soldier on tropical service, and secondly, to briefly indicate the prevention of the chief diseases affecting hot regions. These diseases have certain features which strike the observer at once. First, they are eminently preventable; secondly, a large proportion of them are propagated by human intercourse; thirdly, in the absence of sanitary measures they are apt to take on an epidemic form; and lastly, all of them are due to a specific micro-organism.

The chief points which need careful attention, in order to procure a healthy environment to the soldier, are those connected with his clothing, food, barracks, conservancy of camp, etc. Time will not permit me to do more than very lightly touch on these points.

As regards clothing, let us consider what are the conditions to be carried out as regards the soldier's dress in hot climates. They are:—

1. To maintain an equable temperature, and thus to avoid all those diseases brought on by chill.

2. To reduce the absorption and conduction of heat, and thus to avoid a condition producing heat-stroke.

3. To insure as much reduction of fatigue from mechanical work as possible, and so to lessen liability to heat-stroke.

Such being the purposes to be fulfilled, we find that cotton and wool may be considered, as regards their power of absorbing heat, equal; but in its less power of conducting heat, in its greater power of absorbing moisture and of maintaining an equable temperature round the body, in its better hygienic condition when clothes cannot be washed, and in its lesser power of absorbing contagious principles, flannel is immeasurably superior to cotton stuffs. The soldier in the tropics should wear next his skin textures of the nature of flannel; but whatever be the form of wool which is selected, the material should be of the best kind.

As regards absorption of heat, much more influence is exerted by color than material, black absorbing most; then blue, red, green, yellow; and, finally, white least.

The best color is grey or pale straw color; in fact, some of the tints of khaki used in India answer exactly to the requisite color for the tropics.

As regards "food," according to the environment a definite relation must exist between the amount and kind of food if we wish to obtain the best results. Proteids, fats, starches and salts must exist in certain proportions for the attainment of the best result, and the income of food results in an outcome of bodily movement and bodily heat.

The body must produce more heat in cold climates, and hence more starches and fats are consumed. In a hot climate a corresponding modification must be made.

The more nearly the diet is assimilated to the natives of the country in the substitution of fruits and farinaceous substances for oleaginous articles, the less will be the liability to a disordered digestion.

A large proportion of the digestive mortality in the tropics results

from the habitual ingestion of a larger quantity of food—and that of a rich, stimulating character—than the system requires; hence follows loss of appetite, not due to climate, but to repletion.

Nothing exercises so deleterious an effect on digestion as a monotonous diet. Loss of appetite is bound to arise. Mr. Stanley's observations on the best diet for soldiers during the Nile expedition are specially valuable as coming from an explorer in tropical lands. He insists that soldiers on tropical service need a frequent change of diet to keep them in good health. The horrible monotony of butcher's meat in India has much to do with the so-called climatic diseases.

And with respect to all food, care must be taken that it is not a source of disease. It will be noted how diseased food can give rise to bowel affections; how food poisoned with typhoid and cholera can cause typhoid and cholera; how food can introduce parasites into the system; and how an insufficiently proportioned diet can cause the scurvy.

It is thus seen that food can spread disease by being itself in a diseased condition; by serving as a medium for specific germs; by serving as a place of selection for special parasites, such as tapeworms, etc. The great rules are—(1) to thoroughly cook all meat and boil all fluids such as milk, water, etc.; and (2) reject all food supplies whenever there is a doubt of their being fresh.

In barracks and cantonments let animal food be in part substituted by vegetable; let the fats be diminished—the carbonaceous elements being furnished rather by the starches; but in long marches and on active service animal food should resume its wonted proportions.

As regards the use of alcohol in tropical countries, there can be no question that men are better without it. Nothing is more inimical to the acclimatizing process in tropical countries than the habitual use of alcohol. As regards allowing it on active service in the tropics, one should not pass into extremes. The daily issue of alcohol is to be condemned; but there are occasions in which a ration of alcohol has proved of the greatest service. A man who systematically drinks will most assuredly break down sooner or later. But this is not an argument for total abstinence; it is only an argument against habitual alcoholic poisoning. There should be no issue of rum, strong beer, or spirits in the tropics; but, with advantage, light red wines, well diluted with water, might be used; they form a most refreshing drink, and may act as a preservative against cholera and bowel complaints. On this point I may mention that Mr. Stanley recommends their use, as much as he warns against beer or spirits for an army in the tropics.

Alcohol, in any form, should not be issued either just before or during a march; in camps and barracks it should not be taken until evening. Alcohol in the form of spirits or beer is contra-indicated in all cases where cholera, enteric fever, and other zymotic diseases are likely to occur. But alcohol in the shape of red wines is beneficial, both from the vegetable salts and the tannin contained in them.

Water supply is a subject of the first magnitude. The water supply depends on the nature of the soil on which the troops are placed. Healthy geological soils have, as a rule, good water. Having selected and tested a water source, keep it carefully guarded from pollution; if such a source be a river, let the water be drawn from the highest spot, and let all bathing and washing be below it. If the water be near a native village, examine its relations to the villagers. All water in stagnant pools should be avoided; and in this particular especially warn the men on the line of march rather to rinse their mouths than to swallow such water, when none other is obtainable. Pure water has, if possible, to be supplied. We seem to have arrived at a possible solution of this difficulty at last by the use of Vaillard's sterilizer, which promises good results. On a smaller scale water may be purified by the Pasteur-Chamberland filter. The principle of this filter is to force the water through porcelain, porous enough to allow the passage of the liquid, but barring that of the minutest germs. For their action they require water pressure, and the process is slow but effective.

Tea, coffee, and cocoa should always be supplied in free quantity in hot climates. Cocoa possesses distinct nutrient properties in addition to the stimulating effects of tea and coffee. They all act on the nervous system, quickening the lagging powers and restoring exhausted nature. Coffee and tea, in addition, protect the system against malaria. Coffee and cocoa are especially indicated—(1) for early breakfast before marching; (2) for those on night guard. Tea is indicated for the line of march. In any malarial districts coffee and tea may be given for breakfast; otherwise chocolate or cocoa. A few precautions are necessary with regard to these beverages. Large quantities of strong tea are apt to cause acidity and dyspepsia, hence do not let the brew be too strong for the men's bottles; in fact, all these drinks, when strong, retard digestion; and digestion is ever apt to get wrong in hot climates.

Conservancy is especially needed in damp tropical climates. The dry earth system is the one which generally prevails in barracks and cantonments in India and the tropics generally—it is doubtful whether it is the best. At all events, its success or failure depends on local conditions of soil and place. Sand is useless; it is devoid of those micro-organisms which feed upon and destroy organic matter, and, disintegrating it, render it innocuous. On the other hand, loam affords us just that kind of soil which teems with organic life. It effects its purpose, if we place no hindrance in its way by using strong disinfectants. The greatest security will be attained when all excreta and organic filth are finally disposed of by fire in some form of cremator.

I need only add that the *locale* for all trenches and pits should be perfectly remote from the drinking-water source.

In treating of the subject of camps, we enter upon one of the most important elements in connection with the health of the soldier.

The factor of overcrowding comes into play with far greater force as

regards its consequences in hot climates; the results of overcrowding in the shape of accumulated excreta from the skin, lungs, bowels, etc., will be acted upon by tropical heat.

The choice of site is naturally more important for permanent than for temporary camps; a bad site may be chosen to pass a single night in and then to be left next day without many ill effects; but this would not be the case as regards a permanent camp on the line of communication.

First, as regards unfavorable sites. The following, where possible, are to be avoided: Valleys so narrow that the air stagnates; entrances to gorges; foot of hills with stagnant water at their base; half-dried beds of rivers; jungly ground on banks of rivers or lakes; ground immediately above marshes; fresh clearings, etc. In hot climates the banks of rivers, especially if the water is stagnant, and marsh lands, lands subject to periodical floodings, and especially if covered with mixed salt and fresh water, are particularly unhealthy.

On the contrary, the following constitute good sites: All high and dry grounds; a porous subsoil not encumbered with vegetation, with a good fall for drainage, not receiving or retaining water from any higher ground, and the prevailing winds not blowing over a marsh, will afford the best sites.

As regards the geology and conformation of the features of any locality, the following are the chief points to be borne in mind:

1. The water supply. In favorable sites the water supply is, as a rule, good.

2. The drainage. Good natural drainage is essential for the health of a camp. Dampness is by all means to be avoided. Dampness of soil adds immensely to the liability to camp diseases.

There should be no overcrowding of tents. The question of tentage allowance is not one of transport only. Against the large supply of tents, on the other hand, we have the hampering thereby of military movements. For troops, however, on the line of communications a large tent allowance is indicated. The most open order of camps in time of war gives a much smaller space per head than the most crowded conditions of civil life. Care should also be taken that the site of a permanent camp should be such that the air can freely circulate all over the camp.

As too many men aggregated in one space will infect the air, so will they infect the soil, and with this infection will appear dysentery and diarrhœa, and cholera and enteric fever when the specific element is added. Even when the greatest precautions are adopted, organic matters are thrown out in camps, and by intercourse pressed into the soil, and thus gradually the earth becomes infected. And in hot countries, under the conditions of heat and rainfall, the process becomes much more acute, especially where the soil itself does not possess any disinfecting power. Sandy soils, for example, act prejudiciously both by not

disinfecting these organic matters and by their drying power, so that when clouds of sand are raised by the wind, these clouds carry particles of organic matter. The foregoing statement indicates what can be done in this case—first, to pitch the tents as widely apart as possible; and secondly, move to fresh ground periodically.

The floor of a tent should never be excavated with a view to increase the space; water is apt to lodge in the cavity; the space is nearly always damp, and the occupants are exposed to ground-air emanations. Men should never sleep below the level of the ground, but, if possible, above it.

To prevent the subsoil beneath the tent becoming saturated with filth, tents should occasionally be shifted to fresh ground within the same lines, so as to expose the vacated sites to sun and air. It is well known that tents occupying the same ground for a lengthened period become unhealthy.

The German regulations order that the soil underneath the tents, if not clean and firm, should be dug to the depth of one foot and replaced by gravel, coal dust, etc., slightly watered, and covered by a few boards until hard and dry. In all cases the soil should be beaten down so as to render it less permeable, the surface scraped from time to time and replaced by clean gravel or ashes from wood fires.

In tropical countries night duties should be as limited as possible. When the variations of day and night temperature are great, disease is especially liable to arise. Lord Roberts has drawn attention to the injurious effects of night duty and sentry go, and explains the quicker onset of effects of age on the private soldier after 30 by the influence of sentry duties.

Exposure during guard and transition of temperature on passing from the hot air of the guard-room to the outside air are also causes of disease

I propose now to offer a few brief remarks on the prevention of the more common forms of epidemic diseases to which military service in the tropics renders the soldier liable, and to indicate the most efficient means of keeping an army in health.

Enteric Fever.—This disease, as regards its frequency and diffusion, marks widely its difference from all other forms of disease. It knows no geographical limits, and its very universality and infectiveness make it one of peculiar interest to officers of the British army who, serving in various parts of the world, and under varying conditions of climate, have ever to contend against this disease, often assuming an epidemic form.

In India enteric fever is found under all conditions of diversity of climate, in very hot and very dry localities, in very cold stations in the hills, and in the plains, in different ratios in different regiments at one and the same time located in any given station, and in different ratios in different years under exactly the same conditions of climate. Cli-

mate cannot generate enteric fever no more than it can generate plants and animals. But although a tropical or sub-tropical climate has no influence as a primary exciting cause of enteric fever, yet when once the disease has originated the influence of climate will be shown in a higher death rate.

The mortality from enteric fever in hot climates is always higher than that in temperate ones. Nor is this to be wondered at; there is increased activity in any acute fever due to the diminished resistant power of the individual. It is evident that a man with enteric fever in a temperate climate will have a better chance than a man with enteric fever in a hot climate.

The undermining factors appear to be age and recent arrival in the country. The increased predisposition at an early age is now universally admitted; therefore, what is required is an army of older men to serve in the tropics. But there is a more important factor than age in predisposing to the disease; enteric fever most frequently attacks new arrivals, and with the present system of short service there undoubtedly is a much larger proportion of men serving in India under five years' service than formerly.

The immunity afforded by residence appears to be much more perfect in tropical and sub-tropical regions than in higher latitudes. The protection acquired through acclimatization cannot be denied, though what influence of its own a tropical climate has in this respect is uncertain. The increased prevalence of enteric fever in India has, therefore, been accompanied by, and is possibly dependent on, an increase in the number of young and recently arrived soldiers.

An undoubted rôle in the causation of this disease is played by drinking water; both water and milk are excellent media for the preservation and growth of the enteric micro-organism. All water and milk should be boiled before use in hot climates.

As regards the prevention:

1. We must recognize the fact that enteric fever in tropical and sub-tropical climates is the same as at home. It is dependent on the same causes. The poison is reproduced in the patients suffering from the disease, and is conveyed by water and food which has been contaminated by them.

2. To discover the first case is all-important. Hence men suffering from diarrhœa should always report themselves sick at once.

3. To prevent the origin of the first case, warn the soldier against frequenting native villages and bazaars, and carefully scrutinize all food, whether liquid or solid, especially looking after the water supply and milk from native villages.

4. Should the disease become epidemic, if in camp, the site should be changed at once, and a new one to windward substituted, subject to military considerations. And apart from this, striking camp and changing the ground should be periodically carried out.

In the actual dissemination of the disease, water has been repeatedly proved to play the most important part. Not only in this country, but abroad, various epidemics and groups of cases have been investigated, where a contamination of drinking water by sewage from drains or old cess-pits, and, by inference, with enteric excreta, has been proved to be connected with the outbreak and spread of the disease. Complete and instructive evidences as to the contamination of drinking water by enteric stools and wholesale infection by such water are afforded by the Maidstone and Lynn epidemics.

Further milk plays an important rôle in the dissemination of enteric fever virus; such milk epidemics, where milk had directly, or by the vessels containing it, been brought into contact with sewage-polluted water, have been numerously recorded. Although it is true that, in the greater number of epidemics of enteric fever, the cases are due to specifically contaminated water or milk, it is not safe to overlook other possible modes of the spread of this disease.

In India and other countries where dry systems of conservancy are in force, a possible danger exists in the dislodgment of dried and imperfectly buried excreta from the soil, and their diffusion as dust by winds. If specifically infective, few persons who have knowledge of the circumstances of life of tropical climates will be disposed to deny that such dry excretal matter possesses considerable potentialities for evil. Some are of opinion that the germ of typhoid fever is essentially a micro-organism of the soil, and capable of leading an independent life, and of producing itself in the earth.

My own experiments indicate that in certain soils, rich in nitrates, this organism may retain its vitality for six or more months; if this be so, there is no difficulty in understanding why the disease often appears in the most diverse localities, where previous cases are difficult to trace.

Cholera.—The diffusion of cholera among natives depends entirely upon the numberless filthy facilities which are allowed to exist, and especially in the native villages and resorts, in hot climates, for the fouling of earth, air and water, and thus secondarily for the infection of man with whatever contagion may be contained in the miscellaneous outflowings of the populations, excrement sodden earth, excrement reeking air, and excrement tainted water; these are for us the causes of cholera.

The precise parts taken by air, milk, soil, and water, in the diffusion of cholera has been fully demonstrated. The whole course, not only of the last great epidemic of cholera in Europe in 1892, but of all others, especially in England, shows that the disease is propagated mechanically, and that the influence of soil as a mere influence of place and season, is quite subsidiary. On the other hand, soil may, and doubtless does, serve as a medium in which the cholera virus can survive ontside the human body. Confirmative of this view are the striking instances from India, in which fresh sand from the banks of the rivers used as

bathing places by the infected, placed in filters, has been the means apparently of giving rise to outbreaks of cholera among those partaking of the water filtered through it.

The dangers which have to be guarded against as favoring the spread of cholera infection are particularly the water supplies; and above all there is the danger of pollution of water supplies by house refuse, or where there is leakage from drains, wells, or reservoirs from which the water supply is drawn.

It may be stated that the liability of a place to cholera is exactly its liability to enteric fever and *vice versa*. India affords us conclusive evidence that cholera-polluted water is the cause of cholera.

As regards prevention, the lines to work on are simple. Obtain a pure supply of water, and where any suspicion exists, boil the water.

See that the bheesties' mussacks are kept scrupulously clean. Avoid saline waters, which predispose to cholera; avoid drinking water after a long fast, as an alkaline condition of the stomach is present; take solid food first, especially after a long night's fast.

Let all milk be boiled and consumed at once, and let the cows be milked under supervision, and the vessels into which the milk is poured should be scrupulously clean.

No rum ration should be allowed. Cholera ever attacks the intemperate first; it has a preference for alcoholic drinkers.

Avoid all unripe fruit and all excess in eating fruits. Let the meat ration be well cooked; and, finally, arrangements should be made to keep flies off all provisions. The carriage of disease by flies has recently been insisted on, and the evidence on which it is based cannot be controverted.

I shall now offer a few remarks on camping grounds, where it has been found necessary to move troops on account of an outbreak of cholera.

First, as to the geological structure of the soil. This has no influence itself—the disease has broken out at one time or another on the rocky soil of the Punjaub, the sands of Western India, and down into the alluvial soil of the Gangetic Valley. It has taken root in regions presenting every variety of soil, and situated on the most opposite geological formations. Rocky, dry ground, even, cannot be held to afford immunity. Hence the geological structure, *per se*, is of no influence. But, nevertheless, certain soils are more prone to cholera than others; rocky dry ground is least affected, while loose porous or alluvial soils are most prone to the disease. The factor, indeed, in any locality is its suitability or otherwise for stagnation of water and decomposition of organic matter.

It is thus that alluvial or porous friable soils are favorable to cholera, whilst dry, rocky soils are most favorable to conservancy. All those soils characterized by humidity are predisposed to cholera.

Thus the first indication is to choose as dry and compact a soil as possible to encamp upon.

Next as to height. Height above the sea gives, it is true, no absolute immunity. Still, *cæteris paribus*, the amount of sickness diminishes in proportion to the height ascended above the plains, and if any district be seized, it will generally happen that the low-lying parts are the first attacked.

The explanation of this is that in low-lying ground we have copious ground saturation and an opportunity for deposition and permanent resting of organic matter. Thus, the second rule for camps is to locate them on as high ground as possible, and to avoid places at the foot of any declivity or trough-shaped depression.

Thirdly, for the same reason, avoid camping near the banks of rivers or lakes; it has been well proved that the amount of sickness from cholera diminishes in proportion to the distance from river banks. It is recorded of the army under the Marquis of Hastings, in 1817, that cholera broke out when encamped on the banks of the Indus. Out of 10,000 European troops more than half died of this disease within a very short time. The camp was broken up and removed to dry ground, and the attack ceased. Possibly this great mortality was due to the water being drunk by the men.

The fourth indication is frequently to change the ground. The accumulation of fæcal matters and organic detritus, resulting from too long an occupation of the same ground, must inevitably favor the spread of cholera when once it has invaded a camp.

Finally, all the general measures of camps, such as drainage, conservancy, etc., must be specially looked to in cholera times. We know how the organism of cholera is at once killed by drying; the indication, therefore, is to make our camp as free from soil moisture and moist organic detritus as possible. so as to deprive it of its special conditions of environment.

Although cholera may be imported into any given camp or barrack, believe me when I say that the disease will never become epidemic in that camp or barrack unless the drinking water or milk supplies become somehow or other infected. Hence the first thing to do is to secure a good water supply. Such water should never be taken from a native village, nor even near a village, and let all water be filtered and boiled afterwards.

As regards marches generally, all evidence shows that the state of the body produced by long and fatiguing marches increases the predisposition to cholera. The Indian experiences show that the number of attacks of cholera occurring on the march increase regularly according to the number of miles and the number of days. The element of fatigue is certainly here the influence, for the officers who are mounted are only very slightly affected, while the cavalry suffer far less than the infantry.

Thus, then, as regards marching in cholera times, the marches must be so arranged that the men are not constantly fatigued, and regular halts must be arranged for.

Yellow Fever.—This is a disease which is limited in its habitat. There are only three situations at which the disease bears undoubtedly an epidemic character—in the West Indies, on the Mexican Gulf, and part of the West Coast of Africa.

Recent investigations by careful observers indicate that the disease principally prevails along the banks and channels of rivers which are dry at certain periods, and in the low parts of seaports, particularly those abutting or overhanging harbors, stagnant waters, or foul foreshores. Testimony of this nature clearly defines the existence of a porous, loose, and periodically saturated soil as a constant concomitant of yellow fever prevalence.

Certain conditions of the soil undoubtedly favor the development of the active agent of the disease. Climatic conditions, especially temperature, also exert an important influence upon its propagation. But its causation is more particularly associated with the presence of putrifying fæcal and other waste organic matters, such as accumulate about human habitations.

The tendency of yellow fever to form particular foci of infection resembles the mode of diffusion of cholera.

Yellow fever is particularly a disease of ships; that is to say, its origin is not directly on shipboard, but ships that are in a condition of bad sanitation with their human contamination and septic conditions present opportunities particularly fitted for the growth, development, and spread of the germs of yellow fever.

Two important facts in the etiology of yellow fever are now fully recognized: first, its separation from, and independence of, malaria; and secondly, its propagation by human intercourse. Its origin and spread are favored by the congregation of persons born in the cold climates of northern latitudes, especially when newly arrived in one of the three endemic regions of yellow fever. And from the endemic region the disease can be transported by ships to localities outside the yellow fever zone, as has been the case in England, Malta, Gibraltar, etc. Hence, again, it resembles cholera, in that it is spread by human intercourse, though how this acts is still a debated point. And herein lies the one great fact on which to base its prevention, the fact of its diffusion by man to man.

At those points in the yellow fever zone, where the disease may be said to be endemic, it is the newly arrived persons especially, and those not acclimatized, that are subject to the disease, while the natives, creoles, and acclimatized immigrants enjoy an exemption from it more or less complete.

The pure-blooded negro has a congenital immunity, which immunity is all the more complete the more purely the racial characteristics have been preserved. For Europeans there is no such immunity, except that acquired by residence in the yellow fever zone.

In the yellow fever zone, as in the tropics generally, the necessity of

woollen and flannel clothing is apparent. It is most essential to prevent chills. Fatigue and exposure to a tropical sun predisposes to the disease in the endemic region. Hence again the early march, the breakfast before marching, and regular halts are indicated. If the disease appears while on the march, isolate the sick and look to the conservancy.

As regards sites for camps and barracks, I have mentioned one element in the character of this disease, and that is, its local character.

The disease is especially associated with the sea-coasts and the immediate shores of rivers. It is rarely that the disease penetrates into the interior. Again, the disease is checked by elevation, and occurs principally in the plains; therefore, on debarkation, leave the shore as soon as possible and reach the uplands.

That shore which is washed by the refuse from ships and houses that has been discharged into the sea and exposed to a tropical sun is especially dangerous.

In camps let there be no overcrowding. The predilection of this disease for towns, and particularly for populous places, shows the danger of this, as does also the freedom from it in the open country. Drain the camp as much as possible. Attend to ventilation, and avoid placing the camp where it is exposed to the south and west winds, as these appear to favor an epidemic. Disturb the surface of the ground as little as possible; this is a golden rule. If barracks are occupied, let the men sleep on the upper floors, and avoid the ground floor. Keep away from all ground emanations. At night there is especial danger from the poison of yellow fever. Emanations from the localities containing the yellow fever poison are, during the night, rapidly diffused upwards, and be carried to a considerable distance by air currents. Mosquitoes have also been shown to be able to carry the poison and communicate the disease.

As regards conservancy, yellow fever is essentially a filthy discase. It haunts the low and filthy quarters of seaports, the vicinity of foul drains, and in ships thc foul holds thereof.

So far, yellow fever cities and yellow fever ships have been filthy cities and filthy ships; but whether the disease would spread in a clean, well-drained city we do not know, as there are no such cities in the yellow fever regions.

A curious fact in connection with this disease is that there is only one circumstance covering its history, geography, and remarkable changes in distribution, and that is the slave trade. The advent of yellow fever into the world coincided with the rise of the slave trade; its habitat is, or has been, the ports of debarkation of the slave trade; its exacerbations have coincided with the most lawless period of the negro traffic. Finally, it has been eradicated from the great cities of the Atlantic sea-board since the importation of negroes ceased. The poison has been generated in the crowded, filthy, and unventilated holds of slave ships.

Regarded in this light, yellow fever has been given to us in the dejecta of another race, which, brought in considerable quantities in the bilges of ships to ports, has been then discharged into harbor mud and soil. The scourings of these ships, fermenting and multiplying in the harbor and shore mud, has generated a poisonous virus which has only been too readily carried from harbor to harbor.

In connection with this view, it is curious to note the fact that yellow fever is most persistent at places where there has been least cleansing of harbors or foreshore, or where much stagnation of the harbor water exists, as in places like Havana, Port Royal, Bridgetown, and Port au Prince.

Inasmuch as the slave trade was the original cause of yellow fever, and has now ceased, and that signs are not wanting that outbreaks are diminishing both in frequency and degree, we may hope that the deep waters of the sea may, by their washing, slowly but surely purge the shores of those countries where a cruel slave trade prevailed.

EXTRACTS FROM THE "RIVISTA DI ARTIGLIERIA E GENIO" FOR APRIL.

Translated by CAPT. LUIGI LOMIA, U. S. A.

THE "Rivista di Artiglieria e Genio" for April, 1899, referring to the recent war with Spain, says:

"To-day the United States possesses Puerto Rico, occupies Cuba, has annexed the Hawaian Islands in the Pacific Ocean; has acquired the Island of Guam in the Marianne or Ladrone group as a resting place in the same ocean, and lastly this nation has extended its power as far as the China Sea, with the taking of the Philippine Islands, as large in total area as the whole of Italy.

This new and rapid expansion has been imposed by public opinion, intensified by a not always too disinterested press. This will undoubtedly bring about a permanent increase in the army and navy of the great republic.

Its intervention also in international questions, especially in the extreme Orient and in which the States of the Union will be so largely interested, will naturally follow in the course of time.

"Already, England recalls the ties of race and blood which bind the Americans of the north to herself and seeks and hopes for an alliance in the strife now going on for a continued expansion of its great empire."

In an article giving the historical sketch of the Italian artillery, we

find that the Italian artillery of the present day consists mainly as follows:

24 Regiments of field artillery (186) batteries.
1 Regiment of mountain artillery (6) "
1 Regiment of horse artillery (15) "
11 Brigades of coast artillery (40) "
11 Brigades of fortress artillery (38) "

The first (12) regiments of field artillery are assigned to duty with the (12) army corps, into which the Italian army is subdivided, as corps artillery, while the second (12) regiments of field artillery constitute the divisional artillery.

As regards the rank and number of artillery officers, the following obtains, namely:

Four inspectors of artillery, of whom the ranking officer is styled the Inspector General of Artillery, the rank of these artillery inspectors, varying from that of Major General to that of Lieutenant General, also

42 Colonels.
62 Lieutenant Colonels.
116 Majors.
528 Captains.
946 Subalterns.

A FEW SHORT NOTES ON THE ADMINISTRATION OF THE UNITED STATES ARMY IN THE PHILIPPINES.

By Captain S. S. Long, Deputy Assistant Adjutant-General, Hongkong.

(*From the Journal of the United Service Institution in India.*)

THE Hispano-American War has brought forward a hitherto neglected factor, which is bound to have a considerable influence on international questions: the vast citizen army which it is possible for the United States to get together.

A study of the American forces operating in the Philippines well illustrates the question and is worthy of attention.

The American army before Manila was, with the exception of a small portion, entirely composed of volunteers; and in spite of defective administrative staff and departments, insufficient equipment, and officers who possessed little, if any, more military training than the privates, these troops displayed a spirit of intelligence and obedience, combined with an individual willingness to perform their duty that might be rivalled, but could not be surpassed by the finest disciplined troops.

They might be aptly described a great military paradox. A body of men of magnificent physique possessing perfect discipline, and yet without any discipline at all.

These troops, without previous similar experience, after a journey of 8000 miles, had, practically without naval assistance, to land themselves upon an inhospitable, hostile shore, carry their stores, etc., through—on most days—a heavy rolling surf, and transport them themselves for two miles through deep mud under tropical rains to their camp, which consisted of shelter tents only. Every third day each unit spent twenty-four hours in the trenches facing the Spanish lines—trenches which were little better than dykes, half full of water and mud, absolutely devoid of shelter from the rain, and where, if a man was tired of standing, he had to sit in the slush.

Frequently at night, exposed to a galling and irritating fire from the Spaniards, they obediently complied with orders and patiently bore the enemy's fire without attempting to return it, even when occasionally their comrades were struck beside them. The restraint on the expenditure of ammunition was thought necessary by the American authorities, who feared running short of the supply.

In the advance on Manila on August 13th, although it may be said they were unopposed, still, as far as the junior officers, non-commissioned officers, and men were concerned, they were ignorant that this would be so, and their behavior left nothing to be desired. The advance took place between 11 and 12 midday, and by 5 P. M. every road, bridge, and gateway of the town was carefully picketed and held by American troops, who, the whole of that night, Sunday, and Sunday night, uncomplainingly remained in the streets under heavy tropical rains, good-temperedly carrying out the difficult and troublesome duty of preventing armed insurgents from entering the town, and carefully abstaining from coming into unnecessary conflict with the large mass of Spanish officers and soldiery, who were rather aggressively parading the streets. The most careful inquiries failed to elicit any report of a complaint being made of any act of pillage or assault committed by an American soldier.

If conduct such as this is obtainable from raw volunteers of no experience, and under such unfavorable circumstances, then it should be borne in mind that troops of this sort are a factor to be seriously considered, particularly after they have had a few months' training.

As it may be of some interest to more deeply study the question of the organization of this expedition, it is proposed to slightly touch on the American Army Organization, showing where on the present occasion this organization may be worthy of imitation or, as is too often the case, fatal to the interests of an army in the field.

The American Regular army, which consists of 25,000 men only, is commanded by a major-general, the highest rank in the United States army, any higher being conferred only by a special Act of Congress.

The army is administered by nine departments, each presided over by a brigadier-general; and as all, to a very large extent, work independently of each other, the result is frequently prejudicial to the interests of the service.

They are—

I. The Adjutant-General's.
II. The Inspector General's.
III. The Judge Advocate General's.
IV. The Quartermaster General's.
V. The Engineer Department.
VI. The Subsistence Department.
VII. The Ordance Department.
VIII. The Medical Department.
IX. The Pay Department.

These branches are purely departmental, and, as a general rule, an officer selected for employment in one or other serves the rest of his time therein, with the natural result that the staff and departments are largely out of touch with the army. Appointments to the staff are made from the army generally, usually through political influence, and in some instances even civilians, through similar influences, are appointed to the Pay Department.

I. The Adjutant-General's Department deals with all questions of drill, training, and instruction of troops, but not discipline, which is dealt with by the Judge Advocate General's Department, with the result that the senior branch of the staff, and in fact all branches, and the army generally, are deficient in a knowledge of legal procedure.

II. The Inspector-General's is a special department whose duties are to carry out those usually performed by a general officer commanding in the British service. This department sends its officers to inspect all districts and posts and every branch therein, and reports direct to the Secretary for War.

III. The Judge Advocate General's Department deals with all questions of law affecting the army, and is the direct adviser on these matters. Applications for trial by a military court are, in the first instance, submitted to the Judge Advocate of the post, district, or force, and the proceedings before confirmation again pass through his hands. The power of the Judge Advocate, as an expert, was particularly noticeable at Manila, as every proclamation by the General Commanding appeared to require his jealous scrutiny to see that it did not infringe the law of the land or the Constitution of the United States.

IV. The Quartermaster-General's Department deals with clothing, camping, fuel, light, forage, and all transport, both land and water.

In the district, or in the field, the departmental head is known as the chief quartermaster. Each division, brigade, and regiment has its quartermaster attached to it, known respectively by the official title of divisional, brigade, or regimental quartermaster.

This department, which may have understood its onerous duties in times of peace, and when working in its own country, was apparently without organization or initiative at Manila.

The regimental quartermasters were generally regimental officers without previous experience; and although all certainly worked with the utmost energy, they failed, not from want of ability, but of knowledge.

The clothing of the troops left much to be desired. It is true that the expedition was hurriedly equipped and despatched, but even so it ought to have been possible to send troops into the field with some thin clothing in addition to the heavy clothing of their own country, and certainly some effort ought to have been made to provide a better head covering than the ordinary soft felt hat, which afforded little, if any, protection from the sun. As regards this latter point, owing particularly to its being the rainy season, there were no cases of sunstroke reported.

The men generally worked and paraded in their thick blue flannel shirts and turned down collar, a pair of thick canvas or moleskin trousers, and usually wore no braces, the trousers being kept up by the cartridge waist belt which held 200 rounds of ammunition in a double row. A pair of very good canvas gaiters reaching to within a few inches below the knee and a pair of heavy boots completed this working dress.

The troops had no great-coats on shore with them, but every man had his poncho, *i. e.*, a square of mackintosh, six feet by 4 feet, with a slit in the middle, which could, if necessary, be fastened with a button, and the poncho used as a waterproof sheet. It also had some eyelet holes along the eges, so that, if necessary, two would make a fairly serviceable shelter tent.

The appearance of men walking about, or on parade, with their heads through these pieces of mackintosh, may not be smart looking, but their utility for a variety of purposes, and the excellent shelter they gave to the man, while leaving his hands free, mark them as an article well worthy of adoption.

Every man was provided with a pair of low canvas shoes, which must have considerably added to his comfort in camp.

The requirements of an expedition at a distance do not appear to have been well studied; and many men were deficient of necessary articles, and even after the fall of Manila some were deficient of boots.

SEA TRANSPORT.

A noticeable feature of this expedition was the apparently absolute ignorance of the Admiralty and navy as regards their duties towards the army.

The army chartered, superintended the fitting, equipping and coaling of all transports, with the result that, when they proceeded to sea, they discovered that in some instances they were badly or deficiently found;

and, after arrival at Manila, it was noticed that the chief quartermaster was occupied with questions regarding the coaling and detention, etc., of transports more than with the necessities and requirements of the army.

The landing of the troops and stores cannot be too adversely criticised.

After the destruction of the Spanish fleet and the capture of Cavité on the 1st of May, all steam vessels, launches, boats and lighters that remained afloat fell into the hands of the American navy; and as they were blockading an enemy's port, the captured launches were extremely useful for patrolling purposes, etc.

No steps appear to have been taken by the navy to sound and buoy the best landing places for troops. On their arrival, for two days some assistance was rendered to land a portion of them, but after that they were left to their own devices to do the best they could, having as a means of transport an old paddle-wheel river steamer, and two or three very worn out cranky launches, with a few crazy boats and lighters.

No naval transport officer was appointed, and as a result of this lack of professional assistance, the troops suffered greatly in landing, and a quantity of valuable stores were lost in being brought ashore through the heavy surf.

In this way the whole of the ammunition for the Astor battery was lost, and although a portion was afterwards recovered, this battery was rendered practically useless till the day before the fall of Manila. The work thus thrown on the army would, had they had an enterprising enemy, have certainly led to disaster.

Land transport may be said to have been conspicuous by its absence. A small number of *caramatas* (a small two-wheeled gig drawn by a pony) and a few water buffalo carts had been got together, but were utterly insufficient for the requirements, and what transport existed was entirely deficient of any good organization.

The stores were landed at Paranaque, about two miles from Camp Dewey, and a large bulk of them were carried to camp through the heavy mud by the men themselves. Had it not been for the splendid energy of the troops, inspired by the magnificent spirit that permeated the whole force, the army would have been a little better than an inert immovable mass. No portion of the whole operations deserves more praise than the sight of soldiers laboring under heavy loads, in a tropical climate, carrying their camp impedimenta and stores the 6, 7 and 8 miles from Camp Dewey to the city of Manila on the day following its fall.

The whole working of this department was an excellent example of the need for specially highly trained officers to administer and carry out these important duties.

A point which is more fully dwelt on in the notes on the commissariat, or Subsistence Department, is the separation of commissariat

from transport as carried out in the United States army; a separation which is fatal to the interests of the army, and from which no good results can possibly be obtained.

V. *The Engineer Department.*—The work of this department was hardly anywhere observable. It appeared that many of its trained officers were removed from their corps for other general and staff purposes, and their places taken by both untrained and unqualified officers, with a consequent loss of efficiency.

No steps were taken to run out piers and landing stages, although such could have been easily done, the country in the immediate vicinity being well timbered, and any quantity of bamboo obtainable; skilled labor was at hand, which, under good guidance, could have rapidly built out a serviceable pier and landing stage.

Little, if any, effort appeared to have been made to improve the roads, which, although exceedingly bad, might have been rendered somewhat less so by clearing the ditches on each side so as to draw off the water, which in many places lay several inches deep and caused veritable quagmires.

No special arrangements were made for crossing the river between the Spanish and American trenches, fordable only at its mouth, until the day before the fall of the city, and then some rough bamboo trestles, etc., were hurriedly got together.

As far as could be observed, had it been necessary to storm the city, the loss of life would, owing to the inefficiency of this branch, have been enormous and success very doubtful.

The field telegraph appeared to be efficient and to work well, but was very slow in opening communication.

In connection with this subject the signallers were well trained and appeared to be most efficient, particularly during the advance on the city.

VI. *The Subsistence Department.*—The Subsistence Department is administered by the Commissary-General, whose chief representative in the district is known as the chief commissary. The organization of the department is on similar lines to the Quartermaster's. As its name implies, it looks after all food stuffs required for rationing the troops; but as will be presently shown, it takes on its shoulders not only these requirements, but also practically constitutes itself the sutlers of the army.

As far as the troops are concerned, there is only one scale of rations, no matter where they may be quartered. But this scale admits of infinite variation of diet, and as the allowance is very liberal, the result is that the American soldiers are the best fed troops in the world.

The ordinary daily ration consists of:

$1\frac{1}{4}$ lbs. fresh beef.

1 lb. 2 oz. flour.

$\frac{10}{25}$ oz. baking powder.

$2\frac{2}{5}$ oz. beans.
1 lb. potatoes.
$1\frac{3}{5}$ oz. coffee, green.
$2\frac{2}{5}$ oz. sugar.
$\frac{8}{25}$ gill vinegar.
$\frac{16}{25}$ oz. salt.
$\frac{1}{25}$ oz. pepper.
$\frac{16}{25}$ oz. soap.

The above may be varied as follows:

In lieu of fresh beef any of the following:
Fresh mutton, 1 lb. 4 oz. when price does not exceed that of beef.
Pork, 12 oz.
Bacon, 12 oz.
Salt beef, 1 lb. 6 oz.
Dried fish, 14 oz., when meat cannot be furnished.
Pickled fish, 14 oz., when meat cannot be furnished.
Fresh fish, 1 lb. 2 oz., when meat cannot be furnished.

In lieu of flour and baking powder any of the following:
Soft bread, 1 lb. 2 oz.
Hard bread (biscuit), 1 lb.
Corn meal, 1 lb. 4 oz.

In lieu of beans any of the following:
Peas, $2\frac{2}{5}$ oz
Rice, $1\frac{3}{5}$ oz.
Hominy, $1\frac{3}{5}$ oz.

In lieu of potatoes any of the following:
Potatoes, $12\frac{4}{5}$ oz. and $3\frac{1}{5}$ oz. onions.
" $11\frac{1}{2}$ oz. and $4\frac{1}{5}$ oz. canned tomatoes, cabbage, beets, turnips, carrots or squash.

In lieu of green coffee:
Roasted coffee, $1\frac{7}{25}$ oz. or
Tea, green or black, $\frac{8}{25}$ oz.

In lieu of sugar:
Molasses, $\frac{16}{25}$ gill, or
Syrup, $\frac{16}{25}$ gill.

On this particular expedition the troops drew their meat ration as follows:

6 days' fresh meat.
3 days' bacon and preserved meat.
1 day's canned salmon (1 lb.).

But so long as they drew in the above proportions, they were allowed to draw a proportionate quantity of fresh and preserved meat and canned salmon each day, so that they had bacon for breakfast, fresh meat for dinner, and preserved meat or fish for supper.

From the above it will be seen that the troops are provided with a very good ration, amply sufficient for their needs. The rations which

were provided were of excellent quality and appeared to give universal satisfaction.

An entirely new departure, one of unqualified success, was the provision of a refrigerating steamship, loaded with frozen beef and mutton. This vessel, which contained some thousands of quarters of the above, rendered the question of the meat supply one of the utmost simplicity; and, as far as could be ascertained, the cost of provision was most economical.

The price of the meat was only five cents per pound, and, adding on the charge for demurrage, some thirty pounds sterling per diem, a two months' supply for both naval and land forces, only cost about 4 pence per pound.

This experiment is well worthy of note, as, although in the case in point the troops were close to their supply, it should be borne in mind that, as it takes twenty-four hours to thaw out frozen meat when in bulk, troops could be supplied with meat of this description as long as they were not more than twenty-four hours removed as to transport from the sea, which in the case of railways would mean a considerable distance.

During peace time troops are allowed to accumulate their rations, except meat and fresh vegetables, and at the end of the month, if not drawn, the Government either credits the company with the value thereof, or the accumulations may be sold under company arrangements, and the proceeds credited to a fund for the general benefit, which is expended for the purchase of luxuries such as butter, jams, etc.

Advantage is very largely taken of this permission, and it frequently happens that the unit, even after the provision of all requirements, accumulates large funds, which they devote to extra comforts when travelling, etc.

The department also, to a large extent, supervises the cooking, and the small "Manual for Army Cooks" issued under the orders of the Commissary-General is wonderfully complete and useful.

The contents comprise methods of cooking, cleaning utensils, choice and description of meats, how to save dripping, description of army ranges, bills of fare, savings, company funds, recipes extending to several hundreds, camp cookery, disposal of refuse, extemporized stoves or cooking places, description of field ovens, bakehouses, etc. Hints regarding water and wood, filters, and much other useful information. A point which was particularly noticeable was that there was no provision made for the issue of either a rum or porter ration; and as regards the former, the sale of spirits in any shape or form is absolutely forbidden by Army Regulations.

It was stated that it had been found that troops were more effective and kept their health better when deprived of all alcohol, but well fed. At all meals the soldier had abundance of excellent coffee, and with the

same beverage he invariably filled his water-bottle. The American soldier is an adept at making coffee, and a drink from his bottle is always refreshing and palatable. Frequent drinking of liquid, even water, is strongly discouraged, it being held that once a man gives way to his thirst, he is useless for any further arduous labors that day.

The instructions as regards the preparation of meals on arrival in camp differ somewhat from that usually followed in the British service, it being laid down that only a light meal of a little fried bacon or some other easily provided article is to be served at first, and should be ready within half an hour after the cooks reach camp. The heavy meal is served at a later hour.

The point before mentioned, that the department constitutes itself the sutlers for the troops, appears to be an entirely new departure from the custom of other countries.

Practically the Subsistence Department provides at every post, in charge of the commissary or of a commissariat representative, a large store of articles which can only be accurately described as a well stocked provision shop, and of considerably more variety and better quantity than the average regimental institute in the British service.

Many descriptions of tobacco, cigars, soap, stationery, etc , are kept in addition. All or any of these articles are sold to the troops at the actual cost to Government at wholesale prices at the place of production, the cost of carriage and transport being borne by the State. Officers are also at liberty to purchase at these stores anything they may require for their own or family needs.

As soon as Manila fell, stores of this description were at once opened and a number of Jewish and other camp followers, who had come there naturally expecting to reap a rich harvest, found themselves over 100 per cent. undersold by the Government.

It was stated that until the introduction of this system endless trouble resulted from complaints by posts and detachments in out-of-the-way places that they were unable to obtain goods, or requests for extra allowances to meet the enhanced cost of living at such stations.

This system appears good, and undoubtedly gives great satisfaction and contentment to the troops, and it is stated that in the long run the Government is the gainer by having little difficulty in recruiting, no demands or agitations for extra allowances, and a general contentment with their lot on the part of the officers and men serving.

The provision and maintenance of supplies is provided for by appointing a number of purchasing commissaries, to whom the commissaries of districts or posts send their requisitions each month, except when, owing to climatic reasons, there is a difficulty in keeping up a continuous supply, in which case supplies are forwarded at the most convenient season of the year.

Contracts are only made for short periods, usually one month, and the general custom is to call for tenders by advertising in the newspa-

pers. The system of accounts appears simple, and the work of the department is, as far as possible, run on general business principles.

The great defect in the department, which it is considered would be disastrous in any extended operations, requiring rapid or continuous movement of troops, is the separation of the transport from the control of the commissariat officer.

If it be accepted as an axiom that to be a good commissariat officer, a man must have an intimate knowledge of transport, and *vice versa*, then the United States' system must result in failure.

That transport should always be subversive to commissariat, being simply a means to an end, was noticeable at Manila. The subsistence had everything that the troops could possibly want, but no means of taking it to them, and had they not helped themselves by carrying their own supplies, they would have had to go without.

VII. *The Ordnance Department.*—This department did not appear to be much *en evidence* during the operations, and no opportunity occurred for observing its work.

A point which is fatal to the interests of the country is that there is no such organization as an ordnance committee to decide on the armaments, rifles, and weapons to be used by both naval and land forces.

The navy and army have committees of their own, who work quite independently of each other, and, as a consequence, there is no interchangeability of weapons between the services.

Both the navy and army have lately introduced magazine rifles, but of different calibre, that of the navy being the smallest of any modern weapon in use.

The Regular troops were armed with a new magazine rifle, the Krag-Jorgensen, and short sword bayonet very similar to the Lee-Metford. The volunteers were armed with the obsolete Springfield and long bayonet.

VIII. *The Medical Department.*—Considering the hurried way the expedition was despatched, this department appeared well equipped, and though at no time were they put to any great strain, still the work they had to do was well and excellently performed.

The sick were accommodated in light marquees, six men to a tent, bedded on a folding camp bed with wire wove mattress, 2 feet 6 inches in width, a blanket, pillow, also a bedside table and chair, the space between the beds about 2 feet, any extra bedding or blankets being brought from his unit by the patient. The system adopted at Manila was that surgeons of the Regular forces were employed with the brigade and base hospitals, and volunteer medical officers did duty with each regiment or unit.

No man was taken into hospital unless his state was such that, in the opinion of the medical officer, he required special treatment or diet, otherwise he was treated in his own regimental camp and performed such duty as the medical officer considered him fit for.

The hospital appeared to be very well found in the way of medicine, drugs, instruments and appliances. The medicines and drugs were made up in the most portable form, such as compressed tabloids, etc., and the dressings, etc., were in the handiest shape, and in packets ready for immediate use.

It speaks well for the skill of the department that they were completely successful in a large number of cases of abdominal wounds.

The health of the troops was extraordinary, and was a subject of constant remark. Out of 8000 men who were in camp before Manila, only 124 were left behind sick when they advanced on the town on the 13th August, and of these more than one-half were wounded. The following day—Sunday—the sick were moved into the town and the greater proportion walked, as there was only transport enough to carry the bad cases. If the spirit of the troops was excellent, it was even surpassed by that of the medical branch, who, in spite of a defective transport and many other difficulties, always had their hospitals as complete and efficient as it was possible for human ingenuity to make them.

IX. *The Pay Department.*—This department performs similar functions to that in the British service, except that they deal with and decide all questions affecting the pay, etc., of the army, and are quite independent of the Quartermaster-General's Department.

It committed a great error in bringing to Manila over a million and a half of dollars in gold for the payment of the troops. The consequences were that the men found great difficulty in getting change, and lost considerably by the natives refusing to see any difference between an American gold dollar and a Mexican or Manila silver dollar, although the former was in actual fact worth slightly more than double the latter.

Military Notes.

THE NATIONAL GUARD ON MEMORIAL DAY.

FOR the first time, for many years, we had the opportunity, on the last Memorial Day (May 30, 1899), of seeing the National Guard of the city of New York on review. We were not at the reviewing stand, where everyone in the column was endeavoring to do his best, but we took our point of observation from the Waldorf, and we are glad to say that there was no such disgraceful scene as was enacted in the neighborhood of the reviewing stand. On the contrary, for three blocks in that neighborhood there was nothing but applause for the Seventh Regiment; and the regiment deserved it too, for the ranks were better filled and the marching was more soldierly than any regiment in the column. But it was not without fault, tactically; the men marched with too compact a front, having almost locked elbows, so solid was the platoon formation.

But we did not start to write this communication to speak of any one regiment in particular; nor would the number of a regiment have been mentioned had it not been for the bellowing of a lot of idiots, incited by the cry of a street *gamin*, who was no doubt paid for his trouble.

The guard of the State has its general and staff officers, and it would seem that they should require that the equipments should not only be alike, but worn properly. For instance, the majority of the regiments had the canteen straps slung across the tops of their knapsacks, the canteen hanging prominently in the middle of the back of the knapsack, where it would be impossible for a man to get at it for use. Now, we have always believed that canteens, when worn, were to be of service to the soldier, and we are sure that there was many a poor fellow who wanted a drink of water before he reached Washington Square.

Let this be remembered, that a soldier is never unnecessarily weighted down with traps just for show. It is not done in the Regular service, and why should the volunteer be thus inflicted? If the soldier is to be out for a day only, he takes his canteen, filled with coffee or water, and a lunch in his haversack. If he is to be out for a period not covering any meal time, but requiring a march, he simply takes his canteen filled with water. If he is to be out for twenty four hours, or longer, then he takes his full field equipment, so that he may have his blanket to wrap himself in, his canteen to drink from, his haversack to contain his food, and his knapsack for articles of toilet and change of clothing, according to the work he is to perform.

Some of the regiments had their equipments marked with the letters

of the company and number of the regiment, and some had no marks whatever. Some companies in the same regiment had cap ornaments on their campaign hats (a portion of which were worn on the side and others in front), and some had none whatever. While there is no regulation prescribing these devices for campaign hats, we think it is much the best that some indication of the regiment be shown on the front. We prefer the method adopted by the 22d Regiment—that of having the number stamped in black on the front of the hat. It is distinct in character, and cannot be lost from the hat, no matter in what service employed. Indeed, we should recommend the adoption of that system in the Regular service.

This hat device matter became a serious consideration in the great camps in the South last year. As a rule but few were worn, and these few were removed subsequently owing to various causes—one of which was that the men went about with dark blue shirts and campaign hats and trousers and it was impossible to distinguish the men of one regiment from another. This was utilized in a great many cases by men of the rowdy element, who took advantage of having no insignia about them to commit depredations and create disturbances. If the National Guard is to be what its name indicates, the officers and members of all the regiments of a State should be uniformed alike, when assembled by brigade or division, and no such inconsistencies as men with black and some with tan shoes, some with leggings and some without, and other foot troops dressed in boots—should be permitted.

We regret to have seen some very poor horsemanship among the troopers. If men do not know how, they should be taught the method of holding the reins, and when and how to use spurs. It was also sad to see so many good horses look so ragged in appearance as the various degrees of docking their tails indicated. If such horses are to be ridden in ranks, there should be a uniform degree of docking, or none at all.

Taking the review as a whole we were much impressed with the great improvement in the soldierly appearance of the guard of to-day as compared with that of several years ago, when it was all tinsel and show. Those who paraded on Memorial Day looked as if, had there been work to do, they would have done it.

By the way, it seems that the general idea of the 30th of May is that it should be denominated "Decoration Day." On the contrary, it is pure and simple "Memorial Day." P.

SOLDIER OR GROCER?

In these days, when the importance of a thoroughly sound and continuous military education is so fully recognized—in theory, it is truly remarkable that at what is probably the most critical stage of his career the second in command of every corps is obliged to devote his time almost exclusively to commercial rather than to military pursuits. The

up-to-date canteen has become a positive curse to the senior regimental officers. The choice placed before them is perfectly clear. Should they elect to give their minds to soldiering they must incur the risk of losing their money by failing to exercise sufficiently close scrutiny upon the trade carried on in the canteen; or if, upon the contrary, they think chiefly of the danger to their pockets, or even perform properly their bare duties, as laid down by regulation, in the canteen, they cannot find time to assist their commanding officers, and thereby prepare themselves for the higher military responsibilities to which they hope to succeed. It is quite certain that a second in command who is a poor man, and consequently nervous about the pecuniary liabilities which are thrust upon him by the charge of the canteen and sergeants' mess, cannot possibly do his work as a soldier. Moreover, even the rich man who can complacently endure the prospect of losing money is yet in danger of professional detriment if he be discovered to have neglected his duties as president of the regimental institute.

It is high time that the entire situation should be subjected to careful review and the existing anomaly removed. The officer who is to become commander of a regiment of cavalry or of a battalion of infantry can better show that his selection for such a post is a fit and proper one by devoting himself to purely military work than by qualifying in the management of a retail business. We need lieutenant-colonels who are good soldiers rather than clever grocers, or profound authorities upon the "unaccountable profits" arising from the sale of malt liquor or jam. It by no means follows, because an officer has passed the examination which is supposed to establish his tactical fitness for command, that his military education cannot be further advanced. Surely a certain amount of time can still be devoted advantageously to the study of his profession. In existing circumstances a second in command has no time whatever for reading, and as often as he is employed during the day on any considerable duty under arms, with his corps or otherwise, he must perforce spend the evening upon his institute and other accounts. Truly it is a charming spectacle to see a field officer sit down after dinner to count from twenty to forty pounds' worth of greasy coppers! Yet this is what needs very frequently to be done, and after this task has been completed, from one to three hours will need to be spent in an effort to master the financial situation of the concern.

Here and there officers are met with who have a natural aptitude for accounts, but to the great majority such work is extremely onerous because they are unequal to it, even had they the needful time. There is no doubt whatever that the general feeling of the army is in favor of establishing the "tenant system" in canteens, and elevating the tone of the sergeants' mess by substituting monthly mess bills for the ready-money arrangements now in use. "Locked tills" in the sergeants' mess will of course defeat the efforts of dishonest caterers, but it would be far better to abolish the ready-money plan altogether, when the need

for "locked tills" would obviously disappear. It cannot promote self-respect amongst the sergeants to point to each of them in turn as a suspected thief by employing the precaution of "locked tills." Moreover, the "daily takings" of the sergeants' mess add yet another straw to the already intolerable burden which presses upon the second in command.

The long and short of it is that if we wish our army to be commanded by men who have won their spurs as retail tradesmen, we cannot do better than continue our present canteen system. But if we are sufficiently sensible to prefer soldiers to grocers, then we shall sweep away all these absurdities and institute tenants. The objects for which canteens are maintained are to supply soldiers and their families with groceries, liquor, etc., of good quality at reasonable prices; and by the attractions of the canteen to keep the men to some extent from frequenting low places of resort in the garrison towns. Such a business properly conducted results in profits which are applied to improving the messing, and to providing money for a variety of regimental needs. All the above requirements can be obtained under the tenant system. The tenant of the canteen with the provisional battalion at Shorncliffe hands over the sum of £10 per hundred men per month, and is bound under heavy penalties to supply goods and liquor, to the satisfaction of the committee, according to sample. What can any reasonable being desire more? There is not the slightest excuse for turning our field officers into grocers, when as is perfectly clear the interests of the soldier do not require the sacrifice. Were there a necessity the case would be different. Such little spare time as the military duties of an actively-conducted station or corps may leave at the disposal of a second in command should be spent in study and in recreation. An occasional day's hunting, for example, will do more good than the most intricate "field day" with the canteen steward over the disappearance or unaccountable presence of any 1s. 4¾d. that was ever lost or gained. A move in the right direction has recently been made at Aldershot by applying the tenant system to the canteen of the Army Service Corps. It will be interesting to see how the experiment works in this case.—*Army and Navy Gazette, London, May 25, 1899.*

THE FOOD SUPPLY IN THE WAR WITH SPAIN.

The work of the court appointed to investigate the charges brought by Major-General Miles, and other army officers, against the quality of the food supplied to our soldiers during the war with Spain, and against the refrigerated and canned beef in particular, has just come to an end. General Miles, as is well known, declared in the most positive terms that the greater part of the canned beef was unfit for human food, and that in his opinion, owing to the introduction of chemicals for preservative purposes, the refrigerated beef was in a high degree deleterious. Although the investigating court has had a protracted and tedious ses-

sion, some of its conclusions are disappointing. For instance, the so-called embalmed-beef inquiry bears evidence of being whitewashed—that is, the court comes to the decision that the assertions of General Miles to the effect that the refrigerated beef was subjected to chemical treatment, thereby rendering it unfit for human consumption and eminently hurtful as an article of food, were not borne out by the evidence, and that consequently he was not justified in advancing these allegations. The court, however, finds that the charges brought against the canned beef were to a large extent established, and that General Miles was warranted in affirming its unsuitability for food on the transports, or as a permanent army ration. The evidence throughout the investigation was conflicting and at all times somewhat confusing to the "man in the street." Doubtless this was partly due to a partisan and prejudiced press.

With regard to the statements that the refrigerated beef was chemically treated, the majority of the officers who used the beef in Porto Rico, and in the home camps of instruction, testified that they had no suspicion of such methods being practiced. The testimony of some of the witnesses, who claimed that the beef had undergone the embalming process, was considerably discredited by the fact that their evidence failed to stand the test of examination, and it is also said to have been proved that the beef treated by the Powell process, which Mr. Daly averred to contain boric and salicylic acid, was really innocent of either of these chemicals, but had been treated by fumigation. With regard to the canned roast beef, this is, to use Kipling's oft-quoted words, "another story." The fact was clearly demonstrated that regarded as a nourishing and fitting food for soldiers on active service in a tropical country, this article of diet was found wanting in every respect. In those instances in which the canned roast beef did not become tainted and altogether nauseating, the complaint was made that it was tasteless and unpalatable. Whoever has partaken of canned meat in this country *faute de mieux* will well understand that when it has been exposed for hours to the burning rays of a tropical sun, it will quickly lose whatever nutritive qualities it may have once possessed, and in this state of decay be a source of danger rather than of benefit. The truth is, that all canned meat is useful only as makeshift when fresh meat is unobtainable, and its provision as a regular army ration is strongly contraindicated. This, indeed, was the finding of the court, which stated that the canned roast beef under the conditions existing was not a suitable ration for extensive issues.

The charge made that the canned beef was old, improperly packed, or of inferior quality to that generally put upon the market, was not upheld by the court, which concluded that there was no testimony that any of the canned fresh beef delivered to the Government was of old date, nor was there evidence that the quality of the meat used for canning in May, June, and July, 1898, was different from that generally

used, or that the methods of its preparation differed from those ordinarily pursued in its manufacture. The reasons given for its deterioration were: first, on account of the haste required in its delivery and shipment to Tampa, the meat was not given the time to settle and harden which is usually allowed for that purpose; and secondly, that injury was doubtless caused by rough handling in transportation or was due to the exposure to the climatic influences of the tropics, causing oxidization of cans, starting of seams, etc. The court, however, found it impossible to locate any great quantity of defective cans, and the careful inspection to which one million cans of the beef were subjected in Havana, in January last, indicated no unusual loss due to deterioration in quality or defective packing.

In reference to the question as to whether the food supply was a cause of disease, the report says that this was so only to a limited extent, and that according to the surgeons serving with the troops before Santiago, and those in charge of the general hospitals in the United States, dysentery, diarrhœa, and intestinal disorders of a similar character constituted but a small part of the cases which passed under their observation. The findings of the court, therefore, were in a few words as follows: That the refrigerated beef was a suitable and necessary food for the soldiers in Cuba and Porto Rico, but that the canned roast beef was not.

The subject of canned roast beef has been sufficiently discussed in this article, and with the possible exception of those pecuniarily interested in the matter, there will be found few to dispute the conclusions arrived at by the court on this point. Without wishing in any way to impugn the good faith and rectitude of the members of the court, as these are beyond question, we cannot but think that refrigerated beef has been somewhat unduly lauded in the report. It was clearly shown that a large quantity of this meat was in a putrid state on its arrival at Porto Rico, and it is also a matter of common knowledge that frozen meat will keep sweet but a limited time in a hot climate. The statement is made that refrigerated meat was a necessity, because meat on the hoof was not available; in Cuba there were no cattle, and although there were many in Porto Rico, the court held that the general commanding the troops to be employed in this invasion might reasonably have expected that his antagonist would take the very simple precaution to drive back or destroy all means of subsistence in the country that his enemy could utilize, consequently no reliance should have been placed on the cattle of these islands as a certain means of subsistence. This is unanswerable reasoning so far as it goes, but was it not possible to transport live cattle from this country for the use of the troops? It is true that those in charge of the transport arrangements had many difficulties with which to contend, and perhaps under the circumstances such a procedure was not feasible, but it seems that if, in the first instance, energetic and efficient steps had been taken, this plan might

have been successfully carried out. The campaign in Cuba and Porto Rico has, at any rate, once again driven home the fact that fresh food is indispensable for white men living in the tropics.—*Medical Record, May 13, 1899.*

EMBALMED BEEF.

Anent the recent articles in certain drug journals, that boric acid, borax, salicylic acid, etc., are not injurious to health when used as preservatives in beef, and the alleged experiments on a number of woodchoppers with foods so preserved, it only proves, if it proves anything, that woodchoppers are hard to kill. The chemical manufacturer, drug dealer, or editor of a drug journal is not generally considered by practising physicians good authority in matters which pertain to clinical therapeutics or physiological effects from the use of chemicals as foods, or in the use of chemicals in preservation of foods, and there arises a possible suspicion in the mind of the practising physician, logically the only competent observer, that opinions furnished from the pharmaceutical journals on these matters may be colored by a too partial interest in their advertising drug customers.

Practising physicians and surgeons, especially army surgeons, are the proper ones to judge of the detrimental effects of chemically prepared beef, and since the late war their testimony has been so overwhelmingly against its use that no amount of sophistry, report of whitewash commission, and court of inquiry can refute it.

When the day of successful extirpation of the human stomach arrives, and the substitution of efficient India-rubber stomachs has proven feasible, then boric acid, salicylic acid, formalin, fluo-silicate of ammonium, aniline dyes and other coal-tar products and the dozen of other secret chemicals now advertised, sold and used, may have a chance and be appreciated, nay, even approved of and enjoyed, at the soldiers' camp-fire banquets.

It was a famous soldier, we believe his name was Napoleon Bonaparte, who said: "Armies march and fight on their stomachs." We tremble for the warriors who shall be compelled to do heroic service for their country with only the stomachs they were born with if filled with chemically preserved foods, especially with such chemicals as are not in any sense component parts of the human organism.

The chemist, even if he be employed by a packing house or a fruit, vegetable and sauce canning factory, or an editor of a drug journal ought to know this. If he doesn't, let him submit himself to a disinterested jury of experimenters and become the subject of the dangerous experiments, and feel the results himself before he imperils the health of the public by such monstrous allegations. If a young person employed as a chemist in a canning establishment publicly intimates an opinion that salicylic acid and boric acid as preservatives are not hurt-

ful to health, he might grow wiser if he ate such foods as a soldier, and lived to grow older.—*Medical Record, May 13, 1899.*

ARTILLERY AMMUNITION SUPPLY.

Lieutenant B. Atkinson, R. H. A., writing in the April issue of the "Proceedings" of the Royal Artillery Institution says: In the few articles which have appeared in this country on the desirability of the quick-firing gun as a weapon for artillery in the field, the question of ammunition supply has received but scant attention. This is particularly noticeable in the essays written for the Duncan Gold Medal, 1898, and is the more to be wondered at in that this most important subject presents to us a two-fold problem.

(*a*) Is more ammunition necessary?

(*b*) If so, to what extent and in what manner are we to increase our supply?

With regard to the first part of the problem, the general idea would appear to be that in future the rate of fire will be greatly accelerated, and that therefore our present supply will soon be exhausted. With the exception of Major H. W. W. Barlow, most of the writers appear to somewhat over-estimate the uses of rapid fire, which is of course only intended for the more critical moments of the fight, and would thus prove the exception rather than the rule. For as far as we can tell, the change of weapon will not necessarily imply a change of targets. These will probably remain the same for the quick-firing—as for the present field-gun. Given equally accurate laying and service of the gun, the same if not indeed a smaller number of rounds will be required for their annihilation and the only difference will be the period of time required for the attainment of this object.

Though in these times of swiftly following changes the campaigns of recent years are no criterion, yet they furnish many interesting statistics, of which the following may be found worthy of notice. They are for the most part taken from General Wille's "Feldgeschutz der Zukunft." Until the Franco-Prussian War, the only instance of a battery firing on a single day more than the amount of ammunition carried with it is that of an Austrian 4-pdr. battery at the battle of Königgratz. This battery fired 217 rounds per gun, or 139 per cent. of its ammunition. During the war of 1870, notwithstanding the numerous severe battles of the campaign and the consequently heavy calls on the artillery, the 1344 German guns fired an average of only 199 rounds a piece, or somewhat less than 1½ times the amount of ammunition carried with the batteries. The light batteries of the Prussian field artillery fired no more than 122 per cent., the horse artillery 134 per cent., and the nine c.m. batteries 153 per cent. of the ammunition carried with them. The greatest amounts fired on any single day were: A horse artillery battery at Vionville fired 194 rounds per gun, or 124 per cent. of its ammu-

nition; a light field battery at Vionville fired 173.6 rounds per gun, or 111 per cent. of its ammunition; a nine c.m. field battery at Vionville fired 154.2 rounds per gun, or 116 per cent. of its ammunition. More than the amount of ammunition carried was fired by 22 per cent. of the batteries at Vionville, by only 3 per cent. of the batteries at Gravelotte, and by no battery at Sédan. Moreover, in the two first mentioned battles the necessary ammunition could have been obtained from the neighing batteries without falling back on the columns.

In considering these figures we must also bear in mind the following facts. That any unusually large expenditure of ammunition invariably occurs in the more important engagements. In fact, generally speaking, the number of rounds fired per gun may be said to vary directly with the strength of the forces engaged. That the larger the battle, the slower is its development, and now that smokeless powder has been universally adopted, this condition of things will be even more prevalent in future. On these grounds we may take it for granted that the ammunition columns will generally be close at hand when required, and furthermore these columns would have more than met any demand made on them up to the present time. Again, the system of ranging was vastly inferior to that of the present day, and therefore more rounds were necessary to produce decisive results. Lastly (and this is perhaps the most important of all), we must remember that, as Major Barlow tells us in his very able essay, the only projectile successfully used was the common shell employed by the Germans. Now unless we have greatly overestimated the power of our modern ammunition, less than half the foregoing numbers of shrapnel would have sufficed to bring about the same results. Should this moderate estimate be wide of the mark, then, as Major Barlow recommends, it is high time that we should seriously consider the desirability of reverting to some form of common or segment shell. In conclusion, it is hard to refrain from quoting once again the Okehampton commandant's remark, "nor need rapidity of fire mean expenditure of ammunition, * * *"

Could we but rely on the foregoing figures, any important increase of ammunition would appear superfluous. But alas! so swiftly do the times move that campaigns dating not further than twenty years back may be regarded as ancient history. It therefore behooves us to endeavor to solve the second portion of the problem, namely, to what extent and in what manner are we to increase our supply of ammunition? Of the successful essayists, Lieut.-Colonel Elmslie alone suggests a method. After a preamble over the war of 1870, he admits that it "appears possible that for any given object fewer rounds will be required to produce decisive results than before." Yet in his very next sentence he goes on to say, "but the batteries will not permit themselves to remain idle, and therefore more rounds will certainly be used in the day's work than with slow firing equipments." Now the present writer must confess that he is unable to follow this argument. Though

the necessary decisive results have been obtained with, if anything, a smaller number of rounds than has been the case hitherto, yet, as we see later on, Lieut.-Colonel Elmslie conjectures that the total expenditure will be doubled. How is so large a difference to be accounted for? For more than a half of the total expenditure of ammunition is surely an extravagant amount to allow for other than decisive issues. Possibly, however, to use a German expression, the detachments have been "shooting in courage." Lieut.-Colonel Elmslie then proceeds to take the infantry as a basis, and decides that the artillery ammunition supply must be doubled. In making this demand he appears to attribute the increased infantry supply entirely to the adoption of the magazine. While confessing to ignorance on matters concerning the sister arm, the present writer would venture to suggest that, taking into consideration the decreased weight of the magazine bullet, this increase may be partly due to the ability of the personnel and wagons to carry more ammunition rather than to the necessity of their doing so.

To proceed, however, Lieut.-Colonel Elmslie proposes to carry about 3500 rounds per battery, and distributes them as follows:

Battery, ...	1000 rounds,
Ammunition column, ...	1000 "
" park, ...	1500 "

In other words, he adds wagons to his battery, doubles the size of the ammunition column, and more than trebles that of the ammunition park.

With the first portion of this programme no fault can be found. If extra ammunition must be carried, which however the present writer does not admit, by all means let it be placed where it is in the best position to meet any sudden or excessive demand made on the battery. But the doubling of the ammunition column is quite another question. Lieut.-Colonel Elmslie proposes to effect this by the formation of "light and mobile units, well officered, and capable of moving at good speed across country." Has Lieut.-Colonel Elmslie considered how much ammunition light and mobile vehicles will carry across country with safety? It is to be hoped that a goodly number of qualified wheelers will accompany these columns. But, even granted that such a vehicle were procurable, let us for a moment pause and consider the difficulties in the way of the unfortunate column commander. Even should the "stringent regulations" clear a way for him, and in war time this would be very doubtful, he finds himself behind large bodies of troops, which, were they so willing, in many cases could not give him a clear road. He has received no orders from his brigade division commander, and is in an unknown country. You may see him in your mind's eye, galloping madly to and fro in search of the lost legion, and shedding wagons in every field. No, let the ammunition column remain as before, larger if unavoidable, and let the stringent regulations apply to it.

With regard to the ammunition park little need be said. It is un-

wieldy now and would be more so in future. But one word of sympathy must be given to those "pairs of heavy horses" which, in the absence of motors, are to draw the additional wagons. Had Lieut.-Colonel Elmslie seen the condition of the baggage column horses at Salisbury last year he would certainly share that sentiment. However he was better employed. Though in the writer's humble opinion, a large increase of ammunition is undesirable, we may possibly find ourselves able to steer between the Scylla of Lieut.-Colonel Eimslie's suggestion and the Charybdis of no increase. A certain addition might be obtained without any insurmountable difficulty. It might be partially effected by an improved construction of vehicles, by which of late years the amount of ammunition carried has been raised from 30 to about 50 per cent. of the total dead weight. The experimental carriages of the Paris Nordenfelt Company carry no less than 51 per cent. Our present limbers carry about 36 per cent. and our wagons 37 per cent. of the dead weight. We may also, as Lieut.-Colonel Elmslie proposes, follow the example of our powerful neighbors and add either two or three wagons to each battery. This with two additional wagons would give us 179 rounds per gun for field and 167 per gun for horse artillery. With three wagons, 106 rounds per gun for field and 182 for horse artillery, figures which are never likely to be exceeded. By this means our increased supply would be located where it is most wanted, and we could congratulate ourselves on having placed no further difficulties in the way of the "lumbering unwieldy ammunition column, wearily dragging its slow length along the roads."

LIQUID AIR IN HIGH EXPLOSIVES.

It is to be regretted that the extravagant claims which have been made as to the commercial and industrial value of liquid air should have diverted the attention of the public from the highly meritorious industry with which Mr. Tripler has prosecuted his researches, and the really brilliant success which he has achieved. It was no small triumph for a private experimentalist to succeed in making by the gallon what the most skilled scientists had only been able hitherto to make by the ounce, and at a stroke to reduce the cost of the new substance a hundred fold. In some of his recent lectures Mr. Tripler has expressed himself as feeling hurt by the vigorous manner in which his statements have been attacked; but he should clearly understand that the criticism which he has evoked has been directed entirely at his theories, and does not throw any doubt upon the value of his work.

In his recent lecture in this city Mr. Tripler exhibited fragments of two pieces of pipe, which showed in a very striking degree the powerful explosive properties of cotton saturated with liquid air as demonstrated recently at his workshop. His assistant had placed a small portion of cotton, thus saturated, in a short length of 2-inch gas pipe, and to pre-

vent the flying fragments from doing any damage, had inclosed the 2-inch within a 6-inch pipe. The liquid air cotton was exploded and the 2-inch pipe (which was not tamped in any way) was torn into small fragments which cut their way cleanly through the outer pipe, giving it a sievelike appearance. The high explosive qualities here indicated have been proved by actual test in a European coal mine to be comparable in their effect to those of dynamite; but it is not likely that the new explosive will have any commercial value because its extreme volatility renders it imperative that the liquid air shall be used soon after it has been manufactured and immediately after the charge has been tamped in the hole. Unlike dynamite, it cannot be stored for an indefinite period and used at leisure; for with the present methods of transit in felt-covered cans, a 3-gallon can will be completely evaporated in ten hours' time. Even if it were distributed in double-walled holders, with a vacuum space, as in the Dewar receptacles, the complete evaporation would only be a question of two or three days—an insuperable objection to its use in a large variety of operations where blasting is a necessity.—*From the Scientific American.*

THE FOLDING-BOAT.

One of the most difficult feats that an army in the field has to perform is the crossing of wide rivers without means of standing bridges, which either do not exist at the required place, or else have been blown up by the enemy, and therefore useless. The construction of pontoon bridges takes up far too much time to be any good for a surprise, even supposing the extensive military transport, which carries the heavy bridging pontoons with it were on the spot. The German military administration have endeavored for many years to equip troops with light and portable means of crossing rivers. The folding-boat, that has recently been brought in, has proved to be the best.

These had such satisfactory results in the experiments and trials carried out by the Guard Pioneers in Berlin, that even the cavalry is equipped with these folding-boats, which combine lightness, considerable capacity and small compass, with an almost instantaneous adaptability. The boats have a wooden keel, and thin wooden longitudinal ribs, which are covered with brown water-tight canvas. The wooden body is divided in the centre, and the whole boat can be fitted together or folded up from both sides. In this condition one man can carry it easily under his arm, two men can bring it at the double. With one touch it is pulled apart and placed in the water, a man immediately steps into it and the weight of his body presses the ribs apart, the canvas becomes taut, and the boat is ready for use.

With a quantity of such folding-boats small infantry and cavalry detachments can be transported across, in the latter case by the men sitting in the boats, the horses swimming alongside, held by the bridle.

In the case of larger divisions, the pioneers could throw across a flying bridge of these folding-boats. The boats could soon be placed in a row across the river, at the same time transverse beams or baulks carried with the boats, and provided with rack sticks, would be laid on the boat, and these covered with light planks or chesses held together by means of the rack sticks. In this way, in the shortest possible time, a narrow, and naturally a swaying, but at all events a sufficiently secure, gangway is ready. Whilst one pontoon took up almost an entire wagon, ten to fifty of such folding-boats can be loaded on one wagon, which always remains with the troops, and does not detract from their mobility. The above-mentioned trials were carried out by the guard pioneers, partly in conjunction with other arms, during the month of August of last year.

THE EDITOR desires to call attention to the very excellent paper of Captain S. S. Long, Deputy Assistant Adjutant General at Hong Kong entitled "A Few Short Notes on the Administration of the United States Army in the Philippines," published in the present number of the JOURNAL as a reprint. He also recommends for the careful study of our troops serving on foreign stations the able paper of Professor J. Lane Notter, M.A., M.D., on "The Sanitary Methods of Dealing with Epidemics," published under the head of "Reprints."

Reviews and Exchanges.

Great Commanders.—General Sherman.*

THIS is one of the Great Commanders series, and appears in form exactly like its predecessors. It is adorned with some very fine likenesses, that of General Sherman appearing as frontispiece to the volume. The maps, too, of which there are quite a number, are just the kind of maps a military student needs. They contain everything necessary and nothing superfluous. The letter-press is excellent, the margins ample and the paper good. Altogether one is pleased with the appearance of the volume.

There is nothing insignificant in the life of a great man. His boyhood, his youth, and his early manhood generally give evidence of his character and ability. And William Tecumseh Sherman was no exception to the rule. Loyalty, integrity and courage give evidence of their existence in his character at a very early date, and shine out brilliantly in his subaltern years. But his ante bellum career is so well known from his personal memoirs, that nothing remains to be said on the subject.

The secession of the Southern States found Sherman Superintendent of the Military Academy of Louisiana. He had resigned from the army some time before and had enjoyed a variety of experiences in civil life, which although not yielding him a fortune had added a few things to his education which were valuable to him in his subsequent career. At the beginning of the war he was a poor man dependent upon his salary. He was highly respected by the leading men of Louisiana, and might have secured high position in the service of the State. But he was a true-hearted American, and his letter resigning his superintendency (19) is a manly declaration of that loyalty to the Union so characteristic of his whole career.

Sherman felt that the nation had a claim on his military services. He therefore, on the 8th of May, 1861, formally tendered them to the Government in any capacity which the War Department might think him qualified to fill. On the 14th of May he was commissioned colonel of the 13th U. S. Infantry, and with that rank commanded a brigade at the first Bull Run. On the 17th of May he was commissioned Brigadier General of Volunteers and assigned to duty in Kentucky. (27.) It cannot be said, therefore, that Sherman's abilities were overlooked or under estimated at the beginning of the war.

Sherman's residence in Louisiana had enabled him to form correct ideas as to the earnestness, intentions and power of the South, and his professional training and studies enabled him to form approximate ideas of the military force required to meet the emergency. But Sherman's ideas were not shared by leading men in the Government, by the newspaper press, or by the people. Nevertheless, his outspoken honesty compelled him, when questioned on the subject, to give his diagnosis of the situation and his estimate of the military

* *Great Commanders.—General Sherman.* By General Manning F. Force. New York: D. Appleton & Co., 1899.

force that would be required to meet it. These were so extravagant when compared with current opinion, that Sherman was promptly pronounced crazy by the newspaper press, and some of his military superiors believed that anxiety and overwork had temporarily unbalanced his mind. As a remedy he was relieved from active duty for a time. But his actions must have disproved these hasty assumptions, or perhaps his superiors began to share his views. At any rate he was recalled to activity and after several assignments finally found himself commanding a division in the army assembling at Pittsburg Landing on the Tennessee.

Up to this point the narrative is clear and easy to read, but the chapter on the battle of Shiloh certainly is not. The author seems to have forgotten for the moment that his theme was General Sherman, and as he says, "No battle of the war has excited more controversy than Shiloh," (71) he availed himself of the opportunity to give the facts about the battle. He has given them correctly no doubt; but after reading his narrative one cannot help feeling that the controversies are not likely to be closed by his effort.

Words are the pigments with which pen pictures are produced, not on paper or canvas, but in the minds of readers and hearers of the words; and the skill of the artist is measured by the clearness of the pictures. When a literary artist determines to paint a pen picture of some event, he decides in advance the size of the picture, and how far he can descend into details without blurring its outlines. There is no rule to guide him in making this decision. He must follow his own judgment. Artists are guided by an instinct which it would be difficult for them to describe. Amateurs are generally without that instinct, and overcrowd their pictures with unnecessary details. The safest way, perhaps, is to exclude all collateral matter, and stick to their theme as closely as possible.

In describing a great battle, even if the battle was the theme, which it was not in this case, where should the excluding line be drawn? Certainly the men in the ranks, and even company commanders should have no place in the description. Moreover, the grand outline of the battle might be blurred by crowding in battalion and regimental commanders. Their deeds belong to the histories of organizations and biographies, unless, indeed, where particular acts were decisive of victory or defeat. Then a subordinate commander might become of prime importance. But the artist must decide for himself, knowing that the excellence of his picture depends upon his decision.

In the author's elaborate description of Shiloh, he has admitted too many details, and the picture produced by it in a reader's mind is blurred and indistinct accordingly. The reader never gets a clear glimpse of it. He sees nothing but confusion and uncertaintly. No doubt the facts are all there, but they are badly arranged. They bear the same relation to the desired picture that a pile of bricks and mortar does to a finished building. It is a lamentable fact that Truth may become untrue in the telling, however truthful the teller may try to be.

The advance upon Corinth by General Halleck might, not very inaptly, be described as an attack by regular approaches. It took twenty-five days to advance fourteen miles (82) and when the goal was reached, of course the enemy was gone. But the author says, "Officers and men learned much of discipline, making of reports and returns, picket duty, and the construction of earthworks, roads and bridges," during the advance. Now, if the author meant

to be humorous, that is capital. But some soldiers no doubt will say that for an aggressive army, all that was an evil education. Others, again, might say what has it to do with General Sherman anyhow? There is no pleasing everybody, and Job knew what he was saying when he wished that his enemy would write a book.

The next operations in which Sherman played a prominent part were those devised by Grant against Vicksburg. Sherman commanded the army operating down the Mississippi, while Grant in person commanded the one operating along the railroad from Holly Springs. Success depended upon coöperation, and coöperation became impossible through the treason of the commander of Holly Springs and the enterprise of the rebel general Van Dorn. Grant's depots were destroyed, and so his column was practically hamstrung. But Sherman advanced to the mouth of the Yazoo, and with his usual energy commenced operations against the Confederates in that region, never doubting the coöperation of Grant. Of course his operations were unsuccessful, and in course of time he learned of the disaster which had delayed Grant. These disappointments were not calculated to improve his temper, especially as they were followed by what Sherman must have considered the very brand of disapproval of all his efforts. McClernand appeared on the scene with orders from the Secretary of War, directing him to supersede Sherman in command of the Mississippi column. It is pleasant to note, however, that Sherman showed no temper on the occasion, but accepted his duties as a subordinate with unabated enthusiasm. It takes a sterling man to do that.

But Sherman, although always faithful and true to his chiefs, was not always silent. He always had views of his own, and when they differed from those of his chief, he did not hesitate to state them. When Grant had planned his campaign behind Vicksburg, and informed Sherman of his intentions, the latter was manifestly appalled at the daring and dangers of the proposition. So he filed with Grant what has been called a remonstrance in writing, but was really a plan of his own which he submitted for Grant's consideration, with the recommendation that all corps commanders be directed to do likewise. It looks as if Sherman hoped to induce Grant to change his plan. Of course he failed, but to his eternal credit his loyalty to Grant remained unshaken, and he performed all the tasks assigned to him with undiminished zeal and enthusiasm.

The operations against Vicksburg by way of the Mississippi are well described. The safe passage of the bogus monitor through the fire of the rebel batteries, to the consternation and, finally, self-destruction of the rebel gunboats below the city, is the one humorous incident of the drama. And it was useful as well as humorous. It not only scared the rebel gunboats out of existence, but also demonstrated the feasibility of running the batteries with reasonable chances of success. And so, that feat was accomplished by seven gunboats and three transports on the night of April 16th. By that operation Vicksburg as an obstacle, lost half its terrors.

Grant's campaign behind Vicksburg is correctly described, but like the description of Shiloh it is too much overcrowded with details to be a clear picture. The author seems to forget his theme when he gets describing those grand events, and one cannot help thinking occasionally, that Sherman was the only great commander persistently overlooked. Not that he is altogether absent, but because there are so many prominent figures on the canvas.

The campaign and battle of Chattanooga affords fine opportunities for striking descriptions. Indeed, the battle must have looked to the spectators who were sufficiently remote to be spared the sight of its attending horrors, very like a grand military drama on a magnificent stage. And again, the only fault of the description is the introduction of too many actors of name. No matter how well these actors sang and played their parts, their place was in the chorus. The reader tires of trying to keep their identity and rôles in mind. Indeed, a reader unfamiliar with the armies engaged, will find some difficulty in separating the sheep from the goats in the description. That is, to tell the blue from the gray.

In his researches, which must have been extensive and carefully made, the author has discovered the meaning of "Effectives," in Confederate reports, and the discovery explains those startling figures which are quoted with so much gusto by lovers of the lost cause. Of course, professional men, accustomed to look at lines of battle and estimate the number of men they required, have always laughed at these figures. But the figures have crept into history nevertheless, and it is refreshing to find the explanation even at this late day. In the Union armies "Effectives" meant officers and men present for duty. In the rebel armies it meant "men who carry bayonets." (179.) And a close analysis of Stonewall Jackson's reports will disclose the fact that with him it meant *the number of bayonets in line.*

The assignment of Sherman to the command of the Division of the Mississippi gave him for the first time a command commensurate with his ability. The problems in preparation for the Spring campaign were so difficult as to seem impossible. The burning question of course was supply. Could the army—100,000 men—be supplied over a single track railroad, 472 miles from its base? (199.) And that was not merely a question in logistics. Every mile of the road was exposed to attack, and the rolling stock was short 100 locomotives and 2500 cars. Sherman solved the problem in this way: The managers of the railroads were directed to hold all the rolling stock which reached them from the North. Of course northern managers howled; but Sherman said: "The railroads cannot supply the army and the people too. One or the other must quit, and the army don't intend to." (201.) The question of rolling stock was solved. The other problems were solved with equal felicity, and when the Spring opened Sherman was ready to move.

But Sherman's fame as a great commander will always rest upon his Atlanta campaign and his March to the Sea. And these operations are well described. There is no overcrowding, and the mental pictures produced are clear and distinct accordingly. The operations of Sherman and Johnston from Dalton to the Chattahoochie are like the parry and thrust of two expert fencers, Johnston being compelled, by the skill and superior force of his adversary, continually to give ground. This was wise manœuvring, but it was unsatisfactory to the rebel President, and so Johnston was superseded by Hood. From that moment the character of the campaign changed. What Johnston did by skillful fencing Hood tried to accomplish by hard fighting. The result was the loss of five or six thousand men to the Confederates. Sherman lost about 2000. He was on the defensive in the battle and fought behind intrenchments. This was ruinous to the rebel army, and Hood was cautioned from Richmond not to try it again. (221.)

But the evil was already done. The Confederates, overmatched from the

first, were now hopelessly outnumbered, and unable to prolong even defensive operations. Atlanta had to be given up. This delicate operation was successfully accomplished, each commander acting under a misapprehension of his adversary's intentions. (224.)

Sherman's plans and preparations for the march to the sea are interesting, not only because they are interesting events in his personal history, but because they mark the beginning of the end of the Confederacy. Gettysburg may have given it the death-blow, but the fact was not generally known North and South until Sherman marched to the sea. That the march through Georgia was practically unopposed was no Confederate blunder; it was a misfortune. The Confederacy was exhausted and had nothing to throw in Sherman's way. Even the small garrison in Savannah had to save itself by flight. Grant's terrible earnestness in the vicinity of Richmond; his announced determination "to fight it out on that line," had had its effect. Every available soldier east of the Alleghany mountains had been drawn towards the centre of conflict, and Sherman could march to the sea without molestation. The marching was done by Sherman; the fighting was done by Grant. Such coöperation was essential to success. The march to the sea was no isolated movement. For the first time the armies of the Union were all marching to the same music, and the goal of all their efforts was in sight.

Jefferson Davis must now have realized that the fighting force of the Confederacy was exhausted. He must have realized that Johnston's tactics were less a matter of choice than of necessity, and much as he hated that able commander he could not help recalling him to command. Something must be done to retard Sherman's advance if for no other reason than to enable Lee to escape in the direction of Lynchburg. And so General Johnston was appointed to command in North Carolina. There he collected an army of odds and ends and skillfully operated to retard Sherman's progress through that State. To block his way was manifestly impossible, for he was not alone. Schofield was approaching from Newbern, and Terry from Wilmington, both aiming at concentration and a junction with Sherman somewhere in North Carolina, which it was Johnston's purpose to retard, for he could hardly expect to prevent it. Hence the battle of Bentonville.

In their march through Georgia Sherman's soldiers learned many things unknown in the curriculum of theoretical soldiers. Living on the country through the medium of detachments of foragers appropriately denominated "Bummers" was one thing, and thoroughly destroying railroads was another. Tearing up a railroad track and bending the rails on the burning sleepers seemed to be fairly effective. But bent rails could be straightened in a rolling mill. It was desirable to make that impossible, and so the rails were twisted. A rail so treated had to be melted down and rerolled before it could be used again on a railroad. Rail twisting had been reduced to a science before Sherman's army reached Savannah, and long after the war many of the trees on the line of march were still garnished with railroad iron fancifully tied around their trunks in imitation of a bow knot. The order that all rails must be twisted opened a fine field for humor and inventive genius to the men. (270.)

The advantages of the initiative are well illustrated in Sherman's advance through South Carolina. There were not soldiers enough in the State to oppose him effectively, but if there had been, the prevailing uncertainty as to his objective point would have made effective concentration impossible.

But the march through the Carolines, unlike the march through Georgia was not a walk over. Opposition was encountered all along the front by small parties at river crossings and other points of vantage. But these parties were promptly brushed aside. Columbia was surrendered without a battle on February 17th, the city being on fire caused by an attempt to burn cotton in the main street during a heavy wind storm. (274.)

Sherman's experience in Georgia and South Carolina had perhaps made him a little careless. At any rate his corps were sufficiently scattered when he entered North Carolina, to induce the ever vigilant Johnston to attempt their destruction in detail. But his experience at Bentonville did not justify any further prosecution of his plan. He withdrew his forces during the night and Sherman's junction with Schofield at Goldsboro was accomplished without further molestation.

After a short delay at Goldsboro during which he received some much needed supplies, Sherman resumed his march in the direction of Raleigh, Johnston falling back before him. On that march Sherman learned of Lee's surrender, and shortly after his arrival at Raleigh he received Johnston's proposition for an armistice "To permit the civil authorities to enter into the needful arrangements to terminate the existing war." (296.)

As Sherman was about to leave Raleigh for his first conference with General Johnston, he received the dispatch informing him of the assassination of Mr. Lincoln. With the resulting load of trouble on his mind he drafted, during that memorable interview, the articles of surrender, which were the source of so much trouble to him.

That Sherman, depressed as he was by the news from Washington, and fascinated by the prospect of a general peace, was hardly in the proper frame of mind to draft such a document, and that he was influenced by recollections of what Mr. Lincoln had said at the conference at City Point, will be readily conceded, still one cannot help feeling some surprise that a soldier who always repudiated politics, should have permitted himself to wander beyond strictly military lines. Of course the articles of agreement were disapproved by Grant and rejected by the Government (298), and some wild orders were issued by the War Department. But no real damage was done. Grant visited Raleigh. The armistice was terminated by General Sherman in accordauce with its terms, and new negotiations were opened with the result that Johnston surrendered his army on terms similar to those granted to General Lee. (298.)

The *post bellum* career of this remarkable man need not detain us. Throughout the whole of it he was true to himself and loyal to his friends. His popularity increased as the years rolled by; his jovial disposition remained with him to the last, and "Having rounded out the normal allotment of years of man's life" he died peacefully and was sincerely mourned by the whole nation.

JAMES CHESTER,
Major of Arty. Retired.

The Battles of Trenton and Princeton.*

This is an interesting and well vouched narrative of two very important events in our national history. Popular writers on our Revolutionary period

* *The Battles of Trenton and Princeton.* By William Stryker, Adjutant General of New Jersey. Houghton, Mifflin & Co, Boston and New York. 1899.

deal more particularly with the successes of our armies, and sometimes show a tendency to exaggerate. The result has been that many of the people believed that our struggle for independence was a walk over. That patriotism was universal, and that everybody was eager to join the army and fight. In this way half the heroism of the Revolutionary soldiers has been overlooked. The hardships endured during the winter campaign in New Jersey, so graphically described in this volume, were trials of men's souls compared to which valor on the battle-field seems insignificant.

The battle of Trenton is an interesting study as a perfect example of a military surprise. The author's description, down to the minutest details, is interesting reading, even to one unfamiliar with the locality. And it is not without its value professionally, as well as historically. Courage is an indispensable quality in all commanders, whether supreme or subordinate; but on outpost vigilance is even more important. One feels in reading of the surprise at Trenton, that if Colonel Rall had been a little timid he might have been more vigilant, and therefore less liable to surprise. Over confidence on outpost duty is a crime.

But the careless performance of outpost duty was not the only cause of the catastrophe. The British army in Jersey was badly posted. It may be that concentration and comfort were unattainable; but if that was so comfort should have been sacrificed. The fact is, the British Commander-in-chief underestimated the enterprise of his adversary. A fatal mistake.

The three military maps, showing the town of Trenton and its immediate surroundings are excellent examples of reconnaissance maps. The topography of the position, and the course of the action can be read on the maps with ease.

Perhaps the most interesting part of the volume is Part II. which contains copies and translations of original documents relating to the campaign, collected by the author from various sources, a large number having been obtained from the archives at Marburg in Germany.

The author is to be congratulated on the excellence and thoroughness of his work, and it is to be hoped that the example he sets will be followed by others, until the events of our War of Independence are all set forth each in its own particular setting of topography and circumstance.

JAMES CHESTER,
Major of Arty. Retired.

Points in Minor Tactics.*

From the introductory chapter one learns many interesting facts about the origin, purpose and military value of "The National Guard"; but the statement that "The United States authorities must rely upon the National Guard to supply a force already trained to reinforce the small standing army" (2) has hardly been established by experience. As a matter of fact, very few organizations of the National Guard have been mustered as such into the United States service either in the Civil War or the war with Spain. The greatest mistake that a nation can make on the subject of defense is to trust to a theory which has proved to be impracticable.

The author evidently knows the great defect of militia troops, for he says

* *Points in Minor Tactics.* By Major Charles Albert Smylie, late U. S. V. New York: D. Appleton & Co. 1899.

"It matters little how well the troops are instructed, if the element of thorough discipline is not a part of the being of every soldier." (5.) But he permits his readers to believe that "thorough discipline" can be acquired in a short training such as National Guardsmen undergo. Professional soldiers know that three years of steady work is barely sufficient for it. Soldiering is a difficult trade to learn, and requires a long apprenticeship.

In defining the characteristics of the three arms (9) the author has selected his materials and packed his paragraphs very well. The chapter has an English flavor, enhanced no doubt by reference to the "Star Shell" (11) which has never been a regulation projectile in the United States.

The author has wisely condensed Clery's discussion of "Ground in Relation to Tactice" (13) into a few paragraphs. Indeed there is no better guide than good common sense in the solution of problems involving the use of ground in attack or defense. The soldier who tries to apply text-book knowledge to such problems will generally get left.

That an army without an efficient service of "Security and Information" is almost as helpless as a blind man in a strange situation, and that the French armies in 1870–71 habitually neglected this important duty (17) cannot be denied. But all their disasters cannot be attributed to this cause. At Spicheren, the case cited in the text, the French could see their enemies arriving in driblets and advancing to attack as if inviting defeat in detail, but no attack was attempted, nor any counterstroke when the first German attacks were repulsed.

The definition of Military Discipline quoted by the author from Captain Stewart-Murray (23) is very good, and yet it lacks something. Cheerfulness is an element in perfect discipline. Prompt, cheerful, and instinctive obedience to the orders of a military superior is more complete. It is the highest accomplishment of a soldier, and the hardest to acquire.

The chapters devoted to Advanced Guards, Rear Guards, and Outpost are admirable compendiums of the best methods of performing these important duties. The author has drawn his materials from recognized authorities, and arranged them in a masterly manner.

Patrol and reconnaissance duties are so peculiar that a useful manual of instruction on the subject is almost impossible. As well try to prescribe in detail the methods of a detective. What would be wise under one set of circumstances might be madness under another. Still the author's remarks furnish food for thought to the intelligent scout or commander of a party on reconnaissance. The instructions should be studied rather as suggestions than rules. The scout and the report thereof which strictly followed the rules would often be so loaded with details as to be obscure and perhaps unintelligible.

In the chapter on Marches, the author very properly prefaces his remarks by a discussion of the marching shoe. Some of his recommendations, such as the way to give the shoe the exact shape of the foot (137) are new on this side of the Atlantic, but they seem to be admirable for all that. Soaping the stockings to preserve the feet (139) will be familiar to many old soldiers. The footwear and the load to be carried in heavy marching order will always be important considerations in any discussion of marches. The load our soldiers carry on campaign is not excessive. About 50 pounds, the author says, exclusive of arms, ammunition and accoutrements.

The marching of troops is an art that requires careful calculations if it is to

be a success, and orders prescribing marches must be very carefully drawn. The examples given in the text (143–147) are excellent of their kind, although General Sherman's order is something more than an order to march. The art of writing military orders in our army is much neglected.

In the chapter on Fire Discipline, the author introduces a number of useful definitions. The misuse of military terms is not altogether confined to newspaper correspondents. It is well, therefore, that these definitions should find a place in such a manual. In regard to ammunition supply, the point is made that a small force with abundance of ammunition would be a match for a much larger force scantily supplied. (187.) And what could better emphasize the importance of ammunition supply than that simple statement?

Field Fortifications and Hasty Intrenchments of the latest type, are clearly and concisely explained and discussed in Chapter XI, and Machine Guns in the Appendix. Altogether, the volume is a complete and handy compendium of military information, and should be in the hands of every member of the National Guard.

JAMES CHESTER,
Major of Arty. Retired.

Inquiries Concerning the Tactics of the Future.*

This is the fourth edition of a work by Fritz Hoenig, translated by Captain H. M. Bower, 3d battalion the York and Lancaster Regiment, England, and published by Longmans, Green & Co., 39 Paternoster Row, London. The volume contains 363 pages of well-printed matter, which is somewhat speculative in character, as indeed all such works must be for the present.

The translator, in his preface, tells his English readers that the work is "a remarkable book." The author, in his introductory chapter, states that "Fire-arms have, in a comparatively short time, come to a high state of perfection. Yet hardly any one would wish to assert that no further progress can be expected in rapidity of fire and in its accuracy, in flatness and length of trajectory, and in penetrating power. * * * But we have, even to-day, to reckon with this future of technique, and with its influence on tactics. Of all arms, infantry is the one chiefly affected by the perfecting of the shooting weapon, and the increased importance of fire thus brought about. However, fire-arms can never do away with the peculiarities of the different kinds of troops. It remains as before the allotted duty of the infantry to carry through and decide the combat. It cannot fully solve these problems by a fire fight at long ranges and by the delivery of mass fire from those ranges. It must undertake the combat at close quarters; be brought on to the adversary; and either by fire or by charging, force him from his position, that it may place itself there."

The author then leads his reader on into the technical field of warfare showing that fire-arms alone will not decide battles, but that the terrain will play an important part, and that strategic developments must enter largely into the success of a campaign.

The first part of the work is devoted to inquiries into military history and contains an account of the attack of the 28th Infantry Brigade on the farmyard of Bor and the artificially strengthened wood of Briz adjoining it, in the battle of Königgrätz, on the 3d of July, 1866, which attack the author states "de-

* *Inquiries Concerning the Tactics of the Future.* By Fritz Hoenig. Longmans, Green & Co., London and New York. 1899.

serves to be called the model of brigade leading." Also, the attack of the 19th half division (38th Infantry Brigade) on the heights of Bruville, in the battle of Vionville, on the 16th of August, 1870; Retrospect; Tactics at Problus; Tactics at Mars-La-Tour on the 16th of August, 1870; Aims of the French and German generalship; How ought the attack of the 38th Brigade been planned? Tactical Reflections; and why was the attack of the 1st Dragoons of the Guard successful?

The second part of the work deals with Psychology and Tactics, while the third part is devoted to Tactical Inferences, in which the author points the way of tactical tendencies, shows the results of experiments in surgery and ballistics, and discusses the methods of fighting. He says:

"In the cases where tactical reasons demand that foot-soldiery be thrust forward on a wide surface, one will have to take 800–600 metres as the closest range to the adversary; but in no case may one advance nearer than 400 metres. For the rest, the 38th Brigade at Mars-la-Tour proved that it is possible with good troops and bad formations to advance to the assault, even over open country, till mixing up with the adversary, while opposed to a fire that will never be much exceeded by the small-bore rifle; though I will in truth, not recommend this performance of bravery as a pattern of tactics. At St. Privât, the 1st and 3d Infantry Brigades of the Guard showed that on open ground, when the assailant is in sufficient strength, it is possible to hold out for hours, while suffering extraordinary losses, and this, too, in formations that ought to have been long before laid in the grave. * * * Where the broad plain must needs be taken into the bargain, there is in the sphere of infantry fire but one formation for movement and for fighting. It is the swarm of skirmishers in single rank."

Taken altogether the work is as Captain Bower designates it, a remarkable book, and well worthy the perusal by all officers. P.